A REVISION OF THE GENUS MIMOPEUS (TENEBRIONIDAE)

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Abstract. This paper is the first revision of the genus *Mimopeus* (formerly *Cilibe*) to be published since the review by Gebien in his Katalog Tenebrioniden in 1938-42. Because of the considerable length of this manuscript it has been decided to publish it in two parts. This first part contains a description of taxonomic methods and techniques, a description of the genus *Mimopeus*, a key to species of *Mimopeus* and descriptions of nine new species. These are *M. neglectus*, *M. turbotti*, *M. insularis*, *M. parvus*, *M. vallis*, *M. clarkei*, *M. parallelus*, *M. johnsi* and *M. convexus*. The second part of the paper, which is to be published in the next issue of this journal, will include additional information on previously described species and a critical review of previously published data.

This paper is based on a thesis submitted for the degree of MSc in the University of Auckland (Watt 1961). It covers the genus *Mimopeus* (= *Cilibe*). It deals only with adult beetles, but includes a description of the larva of *Mimopeus elongatus*. My occupation with revising the sub-family and tribal classification of Tenebrionidae on a world-wide basis (Watt 1974) has long delayed publication of this work. The original thesis of 1961 is substantially revised here as a result of further experience suggesting to me that the recognition of sub-species categories does not adequately reflect the patterns of geographical variation which exist in nature and thus overloads the literature with unwarranted subspecies names.

All taxa of terrestrial organisms which have been adequately studied in New Zealand vary geographically. *Mimopeus* is no exception to this. The patterns of geographical variation revealed in this study are chiefly of continuous clinal variation and there are no discontinuities where objective boundaries could be drawn between subspecies.

Some taxa recognised by Watt (1961) as subspecies are now treated as full species because the gaps between them and related taxa appear to be constant i.e. they are not bridged by continuous clinal variation. The patterns of geographical variation are frequently complex; perhaps because of this complexity many old names are now regarded as synonyms.

A key to all N.Z. Tenebrionidae is in manuscript form for the *Fauna of New Zealand* series. Because of geographical variation it is usually possible, with careful study, to determine the geographical source of specimens of doubtful geographical origin.

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In the course of this study, type series of all known nominal species of *Mimopeus* have been examined and lectotypes selected and labelled. The type series of *Mimopeus elongatus* Brême was located in the Zoological Museum of the University of Turin (with the assistance of Professor Pietro Passerin d' Entrèves) in a box separate from the main Brême collection which is housed in cabinets. Lectotypes of the remaining species were examined and labelled in the British Museum (Natural History).

Because of the considerable length of this paper which covers additional research on previously described species as well as descriptions of new species of *Mimopeus*, it has been decided to publish the paper in two parts. The first part consists of a description of taxonomic methods and techniques, a description of the genus *Mimopeus*, a key to species of *Mimopeus* and a full description of nine new species. The second part, which it is planned to publish in the next issue of the *Records*, includes additional information on previously described species and a critical review of previously published data. There are thirty species involved, of which sixteen are synonyms. Finally, there is a discussion on the biogeography and ecology of the genus.

Taxonomic Methods

Specific taxonomic characters

Virtually any observable heritable attribute may provide a useful taxonomic character, if its expression differs from one taxon to another. In this revision the external morphology of the exoskeleton and of the external male genitalia of the adult beetles have been used to define the species, together with what data has been available concerning their distribution and ecology. Certain internal characters and the structure of the ovipositor are used in addition in describing the genus. No visible external character has been neglected, but some have been found to be of no use in taxonomic discrimination at the specific level because of their constancy throughout the genus, while others are of little use in discrimination because of considerable individual and geographical variation. The characters which have proved most useful will be found in the keys and diagnoses, while the others are mentioned in the descriptions. In *Mimopeus* there is not a single specific discriminatory character examined which is not subject to geographical variation. This applies as much to the form of the aedeagus (cf. *M. elongatus*) as to most other characters. The aedeagus, however, shows very little individual variation.

Linear dimensions and ratios

These are useful in specific discrimination in some insects. In such cases the adults vary little in size or proportions. It was decided at the beginning of the study of *Mimopeus* to make series of measurements in order to ascertain whether any dimensions or ratios were sufficiently constant within, and sufficiently different between species, to distinguish closely related species and to study and describe individual and geographical variation.

Measurements were made initially with a linear graticule fitted to a stereoscopic binocular microscope calibrated against a graduated slide.

(a) *Dimensions measured and abbreviations.* The following abbreviations and definitions of dimensions apply throughout this paper, in addition to overall length and width.

Pr.L. — middle length of pronotum.
EL.L — middle length of elytra.
Pr.W — greatest width of pronotum.
Ap.W. — width of apex of pronotum (between points of anterior angles).
H.W. — Head width anterior to eyes (between outer margins of canthi).

"Total length" is an unreliable measurement as the head is frequently bent downwards or partly retracted into the prothorax in mounted specimens. Width and pronotal width are not ideal measurements as the relative positions of greatest width may vary from species to species or even between infraspecific populations.

(b) *Abbreviations for statistics.* The following abbreviations apply to statistics calculated from measurements.

Mean — arithmetic mean.
S.D. — standard deviation.
C.V. — coefficient of variability (S.D. expressed as a percentage of the mean).
N — number of specimens measured.

(c) *Comparision of statistics of populations of Mimopeus.* Table 1 compares statistics calculated from linear measurements of samples of six populations of *Mimopeus.* These populations belong to four species of two species groups (*elongatus* group : *elongatus* and *turbotti; opaculus* group : *opaculus* and *insularis*).

Each sample was selected from a series collected at a single locality, thus representing (presumably) members of a single deme. Sampling was random.

Most of the means differ significantly. The *opaculus* group populations are readily distinguished from the *elongatus* group populations by their larger size, the only overlap of ranges occurring in Pr.W. between *M. turbotti* and *M. opaculus.* It is apparent also that the tabulated dimensions are useless for distinguishing *M. elongatus* from *M. turbotti.* The Red Rocks population of *M. opaculus* is distinguishable from *M. insularis* by the larger elytra of the latter, but if other populations of *opaculus* are considered, the ranges overlap. *M. opaculus* is very variable in size depending on its geographical origin: length 13.1-22.8 mm, width 6.8-12.9 mm).

On the basis of the information obtained from the six populations listed in Table 1 it was decided that the dimensions are not sufficiently useful in separating species to justify the enormous amount of time that would have been required to measure every specimen. With a finely graduated millimetre scale it is possible to measure beetles with an error of ± 0.2 mm or less (which is quite adequate for those as large and variable as *Mimopeus*). Most of the dimensions quoted in the specific descriptions were made thus, and are confined to length and width only. Used in addition to other characters these dimensions will assist identification of some species.

In Table 2 the dimensions of males and females of five populations have been separated and statistics calculated for each sex. The Te Hope population belongs to *M. elongatus* (cf. Table 1 for identity of other populations). The dimensions of specimens of four of these populations have been plotted as histograms in Fig.1.

Table 1. Statistics calculated from linear measurements for six populations of *Mimopeus*.

Dimension	Population	Species	Mean mm	S.D.	C.V.	Range mm	N
Pr.L.	Little Barrier I	e.	2.73	0.26	9.6	2.3-3.1	22
	Mt. Mangere	e.	3.14	0.15	4.3	2.9-3.5	20
	Pararaha	e.m.	3.05	0.14	4.6	2.8-3.3	20
	Three Kings Is	tu.	3.62	0.21	5.8	3.2-4.2	24
	Red Rocks	o.s.	4.61	0.25	5.4	4.3-5.3	20
	Poor Knights Is	ta.	5.26	0.19	5.6	4.8-5.6	22
Pr.W.	Little Barrier I	e.	4.94	0.40	8.2	3.9-5.5	22
	Mt. Mangere	e.	5.12	0.31	6.0	4.4-5.7	20
	Pararaha	e.m.	5.02	0.24	4.8	4.6-5.6	20
	Three Kings Is	tu.	6.58	0.52	7.1	5.5-7.3	24
	Red Rocks	o.s.	7.67	0.47	6.1	7.1-9.1	20
	Poor Knights Is	ta.	8.54	0.44	5.2	7.7-9.2	22
H.W.	Little Barrier I	e.	2.31	0.17	7.3	1.9-2.7	22
	Mt. Mangere	e.	2.55	0.14	5.6	2.3-2.9	20
	Pararaha	e.m.	2.48	0.12	4.8	2.2-2.7	20
	Three Kings Is	tu.	3.00	0.19	6.3	2.5-3.3	24
	Red Rocks	o.s.	3.64	0.23	6.2	3.5-4.3	20
	Poor Knights Is	ta.	3.98	0.16	4.0	3.7-4.2	22
EL.L.	Little Barrier I	e.	8.42	0.56	6.6	7.0-9.2	22
	Mt. Mangere	e.	8.50	0.39	4.6	7.8-9.3	20
	Pararaha	e.m.	8.21	0.36	4.4	7.5-9.0	20
	Three Kings Is	tu.	9.47	0.71	7.5	8.3-10.7	24
	Red Rocks	o.s.	12.84	0.60	4.7	11.8-14.4	20
	Poor Knights Is	ta.	16.18	0.74	4.6	14.9-17.4	22

e.*elongatus*, m.*elongatus* West Coast, o.s.*opaculus* Central North I., ta.*insularis*, tu.*turbotti*

From Table 2 and Fig.1 it is apparent that in a single population the means of males differ (often significantly) from the means of females. It is also apparent that the means of dimensions of a single sex differ significantly between populations, due to geographical variation in size in *M. elongatus*. Marked differences from "normal distribution" in Fig.1 are probably attributable to the relatively small samples.

In some cases one sex (usually male) is considerably more variable than the other. This is true of all five dimensions of the Little Barrier Island population, of four dimensions of *M. turbotti*, and of three dimensions of the Mt. Mangere population.

An index of sexual dimorphism in each dimension has been caculated by expressing the difference of the means as a percentage of their sum

$$\text{(i.e. index} = \frac{M_1 - M_2}{M_1 + M_2} \times 100, \text{ where } M_1, M_2 \text{ are the means}$$

of female and male respectively. If the index is negative, M_2 is greater than M_1). These indices for the four *elongatus* populations are listed below.

Little Barrier I.	Pr.L.3.6	Pr.W.4.7	Ap.W.3.8	H.W.4.6	E1.L.4.8
Te Hope	Pr.L.1.0	Pr.W.1.8	Ap.W.1.7	H.W.0.9	E1.L.2.7
Mt.Mangere	Pr.L.-0.3	Pr.W.+1.2	Ap.W.0.6	H.W.0.4	E1.L.1.5
Pararaha	Pr.L.2.3	Pr.W.2.9	Ap.W.0.8	H.W.2.5	E1.L.3.1

The index of sexual dimorphism varies geographically and from one dimension to another of the same population. Also females average larger than males. This is true of most populations of the genus.

(d) *Ratios.* Figure 2 illustrates by means of scatter diagrams, the relationships between two pairs of dimensions for three populations of *M. elongatus* and one of *M. turbotti.* It is apparent that ratios involving the relevant dimensions are not of

Table 2. Statistics calculated from linear measurements for four populations of *Mimopeus elongatus* and one of *M. turbotti.*

	MALES					FEMALES				
Pop.	Mean mm	S.D.	C.V.	Range mm	N	Mean mm	S.D.	C.V.	Range mm	N
			Pr.L.					Pr.L.		
B	2.98	0.24	7.6	2.6-3.4	10	3.20	0.14	4.4	2.9-3.5	10
H	3.37	0.16	4.6	3.1-3.6	10	3.44	0.18	5.2	3.2-3.8	10
M	3.14	0.14	4.3	2.9-3.3	13	3.12	0.17	5.5	2.9-3.5	7
P	2.98	0.14	4.3	2.8-3.2	10	3.12	0.10	3.1	3.0-3.3	10
T	3.46	0.19	5.4	3.2-3.8	10	3.80	0.15	3.7	3.6-3.9	10
			Pr.W.					Pr.W.		
B	4.65	0.35	7.3	4.0-5.2	10	5.11	0.21	4.5	4.9-3.5	10
H	5.37	0.23	4.3	5.0-5.7	10	5.57	0.29	5.1	5.1-6.0	10
M	5.07	0.34	6.8	4.4-5.4	13	5.20	0.21	4.0	5.0-5.6	7
P	4.87	0.17	3.5	4.6-5.2	10	5.16	0.20	3.9	4.9-5.6	10
T	6.10	0.38	6.2	5.5-6.7	10	6.95	0.26	3.7	6.5-7.3	10
			Ap.W.					Ap.W.		
B	2.84	0.23	7.9	2.5-3.2	10	3.17	0.11	3.5	3.0-3.4	10
H	3.23	0.14	4.2	3.1-3.5	10	3.34	0.17	5.2	3.1-3.7	10
M	3.08	0.20	6.3	2.8-3.5	13	3.12	0.14	4.5	2.9-3.3	7
P	2.93	0.12	4.1	2.7-3.1	10	3.08	0.12	3.9	2.9-3.3	10
T	3.50	0.19	5.4	3.2-3.8	10	3.98	0.14	3.5	3.7-4.2	10
			H.W.					H.W.		
B	2.38	0.19	7.9	2.0-2.6	10	2.61	0.10	3.7	2.4-2.8	10
H	2.67	0.12	4.5	2.5-2.9	10	2.72	0.12	4.4	2.6-2.9	10
M	2.54	0.16	6.2	2.3-2.9	13	2.56	0.10	3.8	2.4-2.7	7
P	2.38	0.11	4.4	2.2-2.6	10	2.50	0.10	3.9	2.4-2.7	10
T	2.82	0.17	5.9	2.6-3.1	10	3.13	0.10	3.2	3.0-3.4	10
			E1.L.					E1.L.		
B	7.87	0.52	6.1	7.0-8.6	10	8.66	0.30	3.5	8.2-9.2	10
H	8.69	0.32	3.6	8.1-9.1	10	9.17	0.32	3.4	8.8-9.8	10
M	8.40	0.38	4.5	7.8-9.3	13	8.66	0.34	3.9	8.1-9.2	7
P	7.96	0.27	3.4	7.5-8.3	10	3.45	0.27	3.2	8.2-9.0	10
T	8.82	0.36	4.1	8.3-9.3	10	10.01	0.38	3.9	9.6-10.7	10

B. Little Barrier I, H. Te Hope, M. Mt Mangere, P. Pararaha, T. Three Kings Is *(M. turbotti).*

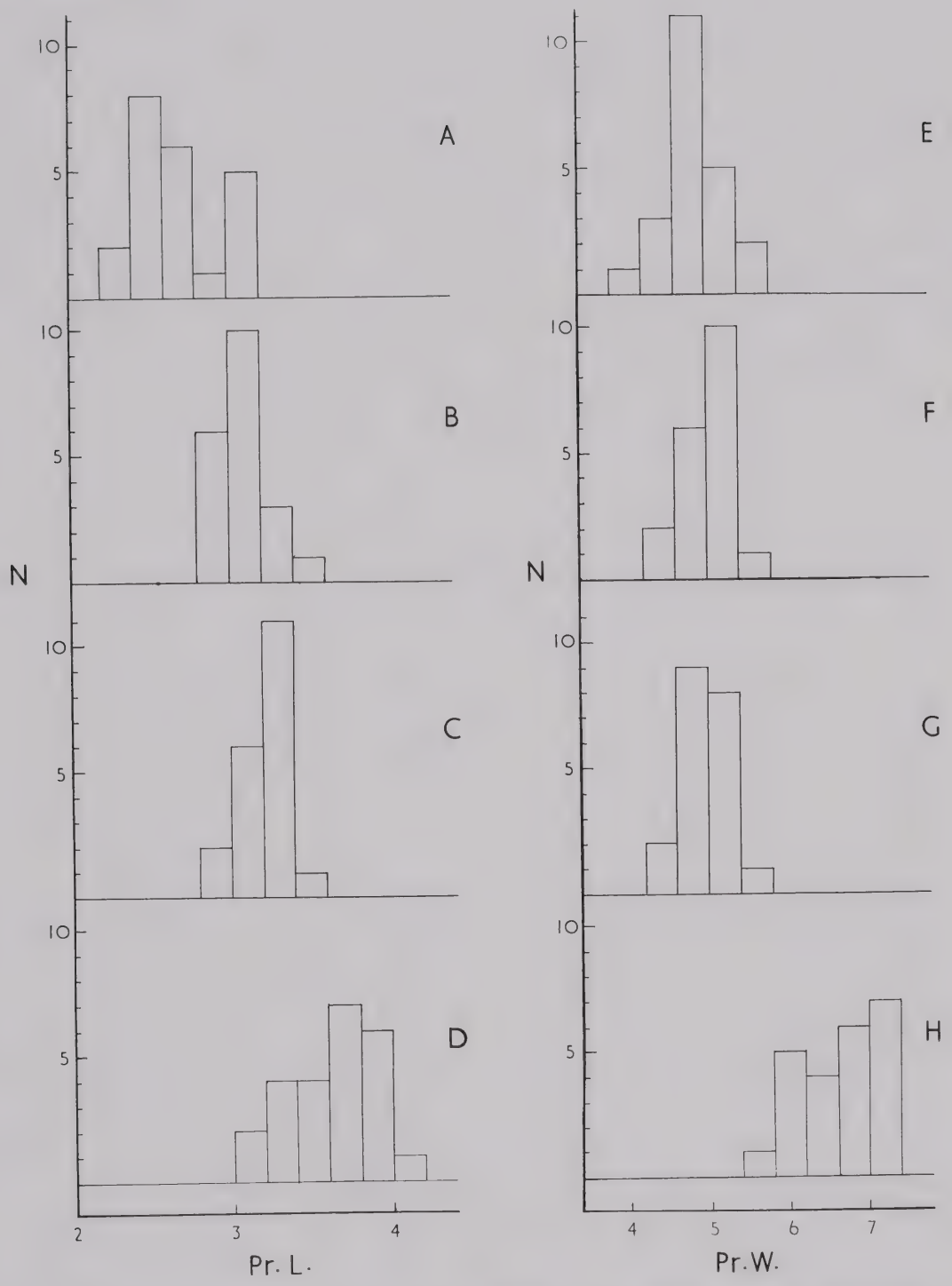


Fig.1. Histograms indicating variation and distribution of certain linear measurements in four populations of the *Mimopeus elongatus* group of species.
N — number of individuals. Pr.L — middle length of pronotum. Pr.W — greater width of pronotum.
A & E — *Mimopeus elongatus* Little Barrier I. B & F — *Mimopeus elongatus* Mt Mangere. C & G — *Mimopeus elongatus* Pararaha Beach. D & H — *Mimopeus turbotti* Three Kings Is.

any use for separating these two species, whether or not the sexes are considered separately. The same applies to other ratios calculated. Ratios express in only a crude way the differences in shape exhibited by various species and infraspecific populations. Such differences are best illustrated by means of accurate drawings or by photographs.

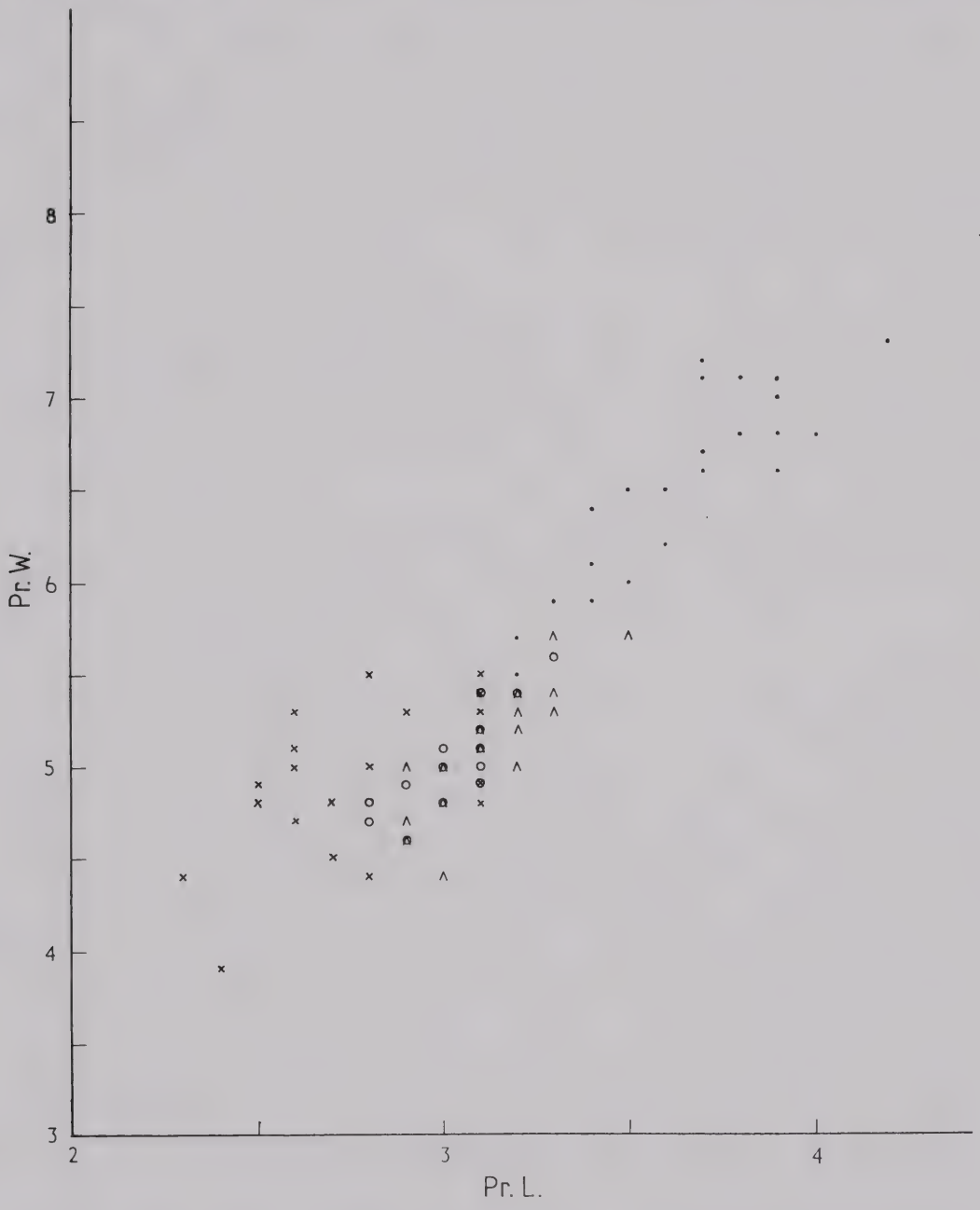


Fig 2. Scatter diagram of pronotal length (Pr.L.) plotted against pronotal width (Pr.W.) for samples of the four populations of the *Mimopeus elongatus* species group listed.

× *M. elongatus* — Little Barrier I.
○ *M. elongatus* — Pararaha Beach.
∧ *M. elongatus* — Mt Mangere.
● *M. turbotti* — *Three Kings Is.*

Individual and geographical variation

The study of dimensions and ratios described above shows (a) that measurable geographical variation occurs in even fairly closely related populations; (b) that considerable individual variation occurs within populations; (c) that all populations show sexual dimorphism (with females usually averaging larger than males); (d) that the degree of sexual dimorphism is geographically variable; (e)that one sex may be more variable individually than the other; (f) that the coefficient of variability varies geographically and (g) that the differences in variability between the sexes vary geographically. These generalisations are applicable to all geographically variable characters, with the qualification that most unmeasurable characters (e.g. punctation and sculpture) show an appreciable sexual dimorphism.

Generic taxonomic characters

The subfamily and tribal classification of Tenebrionidae is based almost exclusively on the external morphology of adults (Watt 1974; Doyen & Lawrence 1979). From a practical point of view, as most adults in collections are dried, structures of the integument are most important. These are mouthparts, tentorium, meso- and metanota and hind wings, abdominal tergites, spiracles, endosternites, especially the metendosternite (cf. Crowson 1938, 1944), the male aedeagus and female genitalia and associated structures.

As much morphological information as possible at the generic level is necessary for providing reliable data on which to base a sound supra-generic classification. This includes the morphology of larvae and pupae.

Techniques

Large beetles should be pinned wth strong stainless steel pins, not gummed by their ventral surfaces to pieces of card. Male genitalia are best extracted from the abdomen of relaxed specimens when they are being mounted. For dissection of female genitalia including delicate internal structures see Doyen & Lawrence (1979). Genitalia are removed from dried specimens by breaking off the abdomen and then soaking it in Barber's beetle relaxing fluid or hot water (Beirne 1962) until the tissues are soft, or by soaking the whole insect in the fluid. On removal, the aedeagus is cleaned and mounted slightly on its side on a strip of card, which is then placed on the pin underneath the beetle; or in glycerine in a microvial. Female genitalia should be kept in glycerine, as they cannot be examined satisfactorily if dry. If the abdomen has been removed, it should be glued back on the specimen from which it came.

For examination of internal structures it is necessary to treat the whole specimen with KOH solution. Treated specimens can be examined, drawn and kept in glycerine. It will probably be found desirable to make slide mounts in Canada balsam of small structures, such as mouthparts.

It is very useful to have some specimens of each series properly fixed and preserved in 70% alcohol + 5% glycerine, together with larvae and pupae if these were collected at the same time. Properly preserved specimens are more useful than dried material.

All drawings in this revision were made using a squared eyepiece graticule and squared paper. Most were made from dried specimens, but those of mouthparts, metendosternites, etc., were made from slide mounts and glycerine preparations following treatment with KOH.

Material Examined

Over 3,200 adults of *Mimopeus* have been examined and identified. In a number of cases it has been necessary to select lectotypes from series of syntypes. To the best of the writer's knowledge, all major collections of *Mimopeus* have been examined. A list of institutions where material is held is given below.

For details of the usage of the names *Cilibe* and *Mimopeus* see Watt (1968). In summary, many species which were originally placed under the generic name *Cilibe* now must be placed under the senior synonym *Mimopeus*.

Collections and Collectors

To keep this paper as short as possible the names of collectors have been omitted from the list of material examined. Full data are recorded on cards at Mt Albert Research Centre, Entomology Division, DSIR. Most of the specimens on which this revision is based were collected by me, and at the same time notes on ecology and bio-geography were made. In many instances immature specimens were collected in association with adults. These were all carefully labelled with the association and are available (at NZAC) for further study.

Other collectors who contributed valuable material to this revision are as follows (listed by institution where most of material is housed).

Entomology Division, D.S.I.R., Auckland, Arthropod Collection (NZAC). E.S. Gourlay, B.B. Given, G.W. Ramsay, J.S. Timlin, J.I. Townsend, J.S. Watt, J.M. Hoy, R.J. Tillyard, A.E. Brookes (including T. Broun Collection), W.P. Thomas, B.M. May, R.A. Cumber, A. Tonnoir, G. Kuschel, L. Marchant, J.D. Fawcett, A. Philpott, A. Richardson, C. Fairburn, R.W. Taylor.

Auckland Institute and Museum (AMNZ). Through generous donations the Auckland Museum has one of the most complete collections of *Mimopeus*. P.M. Johns, J.C. Watt (part of collection given to NZAC). C.E. Clarke (part of collection bought jointly by AMNZ and BMNH), E.G. Turbott, K.A.J. Wise.

British Museum (Natural History), London, England (BMNH). T. Broun, (including T. Hall, W.W. Smith, G.V. Hudson, F.W. Hutton, J.A. Urquhart, A.E. Brookes, F. Buchanan), H. Swale, C.E. Clarke (collection divided with AMNZ), C. Darwin, F. Bates (who had an important collection of N.Z. Tenebrionidae but there is no record that he himself visited New Zealand; he may have acquired the collection by purchase).

Forest Research Institute, Rotorua (FRNZ). J.S. Dugdale, R. Zondag, R. Milligan, R.J. Mac, J. Rawlings, J. Cox, J. McBurney.

National Museum of New Zealand, Wellington (NMNZ), R.R. Forster, B.A. Holloway, G.W. Ramsay, G.V. Hudson, A. Harris, N. Hornibrook, H. Wellman, C.A. Fleming, A. Castle, J.T. Salmon, R.A. Falla, R.A. Ordish.

Canterbury Museum, Christchurch (CMNZ). F.W. Hutton, P.M. Johns, R. Pilgrim.

The Genus *Mimopeus*

Tribal placement of Mimopeus

Mimopeus under the name *Cilibe* was included under the predominantly Australian tribe Helaeini. However, Gebien (1938-42) in his Katalog Tenebrioniden listed it in the predominantly Australian tribe Nyctozoilini without giving any reasons. However, I believe the placement in Helaeini is correct. This opinion is based on a superficial examination of the Australian genera *Helaeus*, *Pterohelaeus*, and *Saragus* and associated larvae, but it remains to be checked. *Mimopeus* differs from these Australian genera in lacking hind wings (*Pterohelaeus* is fully winged). It differs from *Helaeus* as the sides of the pronotum and the elytra are not thinly explanate.

The tendency to develop foliate lateral expansions of pronotum and elytra is not uncommon in Tenebrionidae, and has apparently evolved independantly a number of times in widely separated tribes; e.g. Eurychorini (*Eurychora* etc.), Eleodini (*Embaphion*); Helaeini, Cossyphini. Foliate expansions are not present on the elytra of all species of *Mimopeus*, being entirely absent in *M. rugosus*, *M. convexus*, *M. tibialis* and *M. impressifrons*, and poorly developed in other species.

Gebien (1938-42), for unspecified reasons, placed the New Zealand genus *Mitua* (=*Pseudopatrum*) next to *Mimopeus* in his catalogue. *Mitua* is quite unlike either Nyctozoilini or Helaeini in adult structure, especially of aedeagus and ovipositor. Its larval structure (Hudson 1934 : 86 and Plate 9, fig.3a) is not at all like that of *Mimopeus*. *Mitua* belongs in Adeliini.

Of New Zealand Tenebrionidae, *Mimopeus* is much more likely to be confused at first sight with *Pheloneis* (Adeliini) rather than with *Mitua*. In *Pheloneis* the clypeus is very small, there are distinct striae formed by rows of punctures in the elytra, the intercoxal processes are quite unlike those of *Mimopeus*, intercoxal processes and abdominal sternites lack submarginal grooves, and the mentum is more convex and has more strongly rounded sides. There are other less obvious differences, which reflect the comparatively remote relationship of the tribes Helaeini and Adeliini.

Changes in specific nomenclature

In this study it has been found necessary for a variety of reasons to place certain specific names in synonymy. The main cause of this synonymy is the failure of earlier workers to appreciate the degree of geographical variation in species.

This is hardly surprising considering the limited material with which they had to work.

T. Broun was the only author with first-hand knowledge of the beetles in the field. Of the 26 nominal species listed by Gebien (1938-42), only 12 are recognised in the present revision. In addition nine new species are described. Most of the synonymy was published by Watt (1968) and is updated in the description of species later in this paper.

Species to be excluded

"Cilibe" asidaeformis Fauvel (Fauvel 1904 : 187-8) from Ile des Pins, New Caledonia, was placed by its describer in *Cilibe*, which from 1859 (Lacordaire 1859) until then had been regarded as a strictly New Zealand genus.

It was transferred by Kaszab (1982) to the Adeliini genus *Pseudocilibi* endemic to New Caledonia.

Genus **Mimopeus** Pascoe, 1866

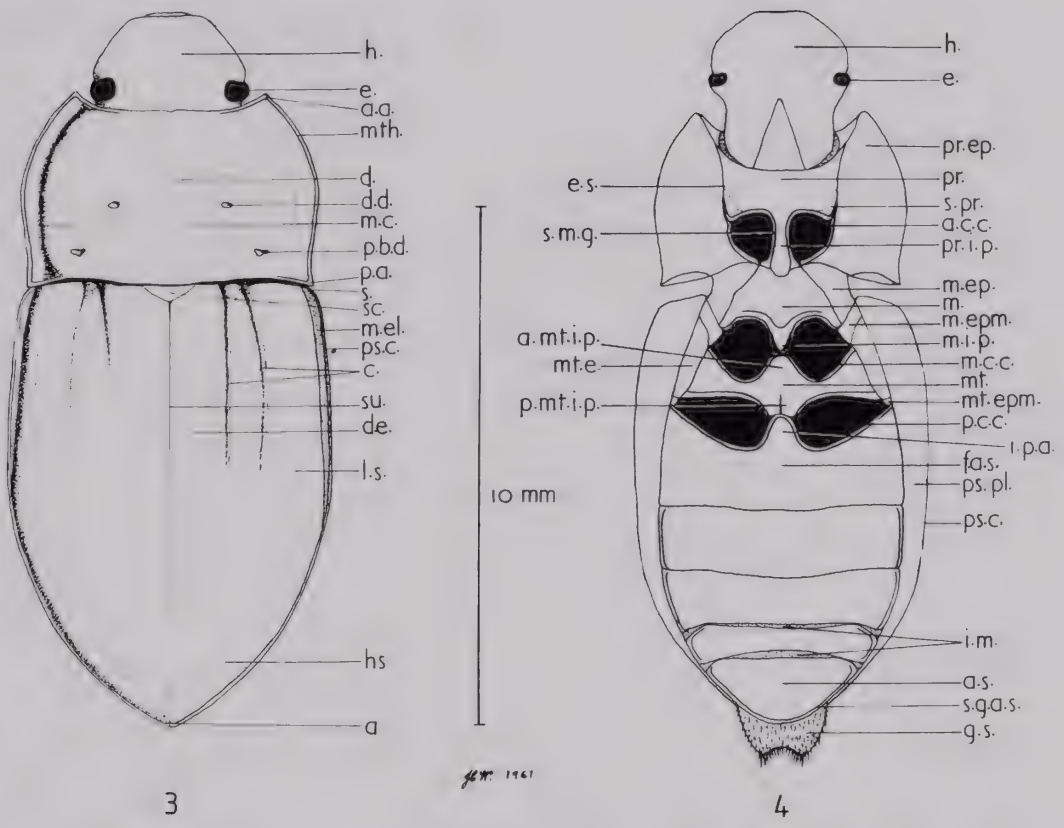
Pascoe, 1866, Journ. Ent. 1: 368.

Type species. *Mimopeus elongatus* (=*Cilibe elongata* Brême, 1842).

Moderately elongate scarcely depressed. Sides of elytra scarcely or not explanate. Prosternal intercoxal process only slightly convex. Surface almost smooth with very short, very fine microscopic setae. Anterior intercoxal process of abdomen narrowly triangular. Last abdominal sternite with a fine marginal groove underside finely and sparsely punctured. (Figs.3,4).

Antennae. Approximately as in Fig.7. Segements 2-7 almost circular in cross-section, remainder dorso-ventrally flattened. Each of the basal segments bears a ring of comparatively stout setae near its apex, but these become progressively finer and shorter after segment 7. There are finer and shorter setae over the remainder of the surface. Ratio of length of segments 2 : 3 : 4 : 5 approxiately 1 : 2.3 : 1.6 : 1.3 (*M. elongatus*, KOH preparation — varies slightly from this in other species). The setae arise from small punctures. Microsculpture visible at 25 × magnification is visible on terminal segment (11), and usually on segments 8-10.

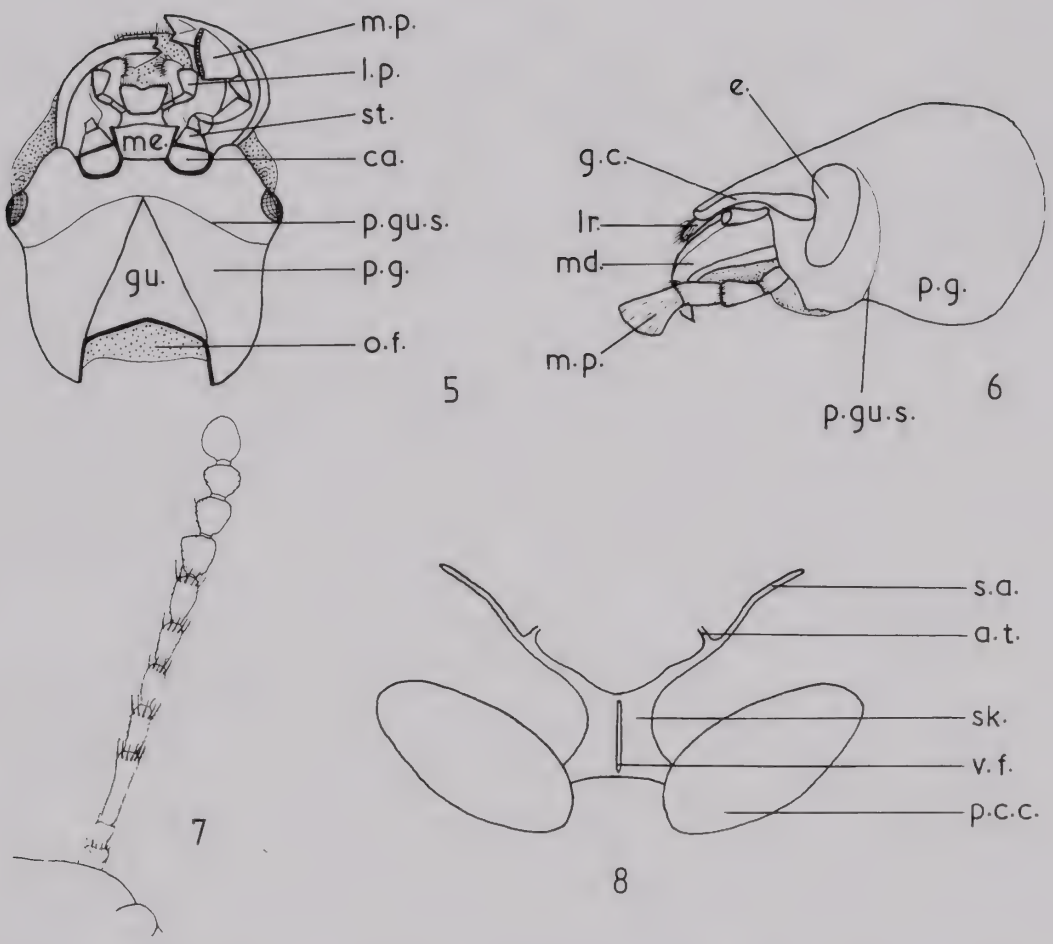
Dorsal surface of head. Clypeus emarginate anteriorly, clypeal sutures faint; edge of genal canthus rounded, extending about as far laterally as eyes. Eyes reniform, embracing genal canthus, upper lobe more extensive than lower lobe (Fig.6), facets large, each clearly visible at 10 × magnification. Punctation of surface variable, but always with macropunctures, on interstices between which are considerably smaller micropunctures; interstices flat or convex, uneven in closely punctate species, microsculpture weak to strong.



Figs. 3, 4. *Mimopeus elongatus.* Details of whole insect, male. 3. Dorsal. 4. Ventral.

h.head, e.eye, a.a. anterior angle, mth.mesothorax, d.disc, d.d. discal depression, m.c. marginal channel, p.b.d. prebasal depression, p.a. posterior angle, s. shoulder of elytron, sc. scutellum, m. el. margin of elytron, ps.c. epipleural carina, c. costa, su. suture (between elytra), d.e. disc of elytron, l.s. lateral slope of elytron, hs. hind slope of elytron, a.apex, pr.ep. proepisternum (frequently termed prosternal hyposternum), pr. prosternum, e.s. episternal suture, a.c.c. anterior coxal cavity, pr.i.p. prosternal intercoxal process, s.m.g. submarginal groove, m.ep. mesepisternum, m. mesosternum, m. epm. mesepimeron, m.i.p. mesosternal intercoxal process (anterior process), a.mt.ip anterior metasternal intercoxal process, mt.e.metepisternum, p.mt.i.p. posterior metasternal intercoxal process, m.c.c middle coxal cavity, mt. metasternum, mt.epm. metepimeron, p.c.c. posterior coxal cavity, i.p.a. intercoxal process of abdomen, f.a.s. first abdominal sternite, ps. pl. epipleuron, ps.c. epipleural carina, i.m. intersegmental membranes between abdominal sternites, a.s. abdominal sternite (last movable sternite), s.g.a.s. terminal ventrite, g.s. genital sternite.

Pronotum. Considerable variation in shape exhibited, both within and between species. Almost flat to convex. Always transverse. Emarginate anteriorly, with distinct but often blunt anterior and posterior angles, width always greater between posterior than anterior angles, sides generally with distinct marginal thickening. Marginal channels generally present sometimes obsolete, sometimes with broad upturned flanges outside them. Depressions usually present on either side near base, often in middle near base, and sometimes on disc; apparently without



Figs. 5-8. *Mimopeus* spp. Details of head and thorax. 5. *M. elongatus.* Ventral view of head, right maxillary palp removed. 6. *M. elongatus.* Lateral view of head. 7. *M. elongatus.* Dorsal view of antenna. 8.*M. opaculus.* Dorsal view of KOH-treated preparation of metendosternite, tilted down slightly from left to right.
m.p. maxillary palp, l.p. labial palp, st. stipes, ca. cardo, p.gu.s. pregular sulcis, p.g. postgena, o.f. occipital foramen, me. mentum, gu. gula. e. eye, g.c. genal canthus, lr. labrum, md. mandible, s.a. arm, a.t. anterior tendon, sk. stalk, v.f. ventral flange, p.c.c. posterior costal cavity.

taxonomic significance. Punctation very variable, but always with macro- and micropunctures, although in some populations some of the latter are replaced by small granules. In some cases macropunctures bear short, small, recumbent setae, just visible at 25 × magnification.

Elytra. Fused along suture (hind wings vestigial). Epipleural carina always present, generally with a distinct submarginal channel inside it, at least near base. Suture often slightly raised. Three primary costae corresponding in position to main longitudinal tracheae often visible as indistinct elevations, sometimes quite distinct.

Sometimes with indistinct secondary costae between primary costae. There is no trace of striae. Punctation of upper surface irregular, of same type as pronotum, but punctures smaller or larger than those of pronotum, depending on the species. Macropunctures usually bearing short, fine hairs visible at 100 × magnification, sometimes at 25 × magnification. Microscopic granules often present on hind slopes and lateral slopes, sometimes on disc. Microsculpture weak to strong. Epipleura relatively broad, deflexed at roughly 45°C, punctation always unlike that of upper surface, punctures usually much smaller, granules sometimes present.

Mesonotum. Scutum well sclerotised, crescent-shaped, very transverse about five times wider than long. Median longitudinal impression and posterior suture (between scutum and scutellum) distinctly impressed. Dorsal surface closely punctured, each puncture bearing a fine, short seta. Transverse struts present ventrally. Prescutum (if present) completely membranous and indistinguishable. Scutellum broadly shield-shaped, distinctly raised posteriorly above level of scutum — this raised portion is approximately triangular, and is the visible part described in specific descriptions. Axillary cord extending slightly further laterally than scutum.

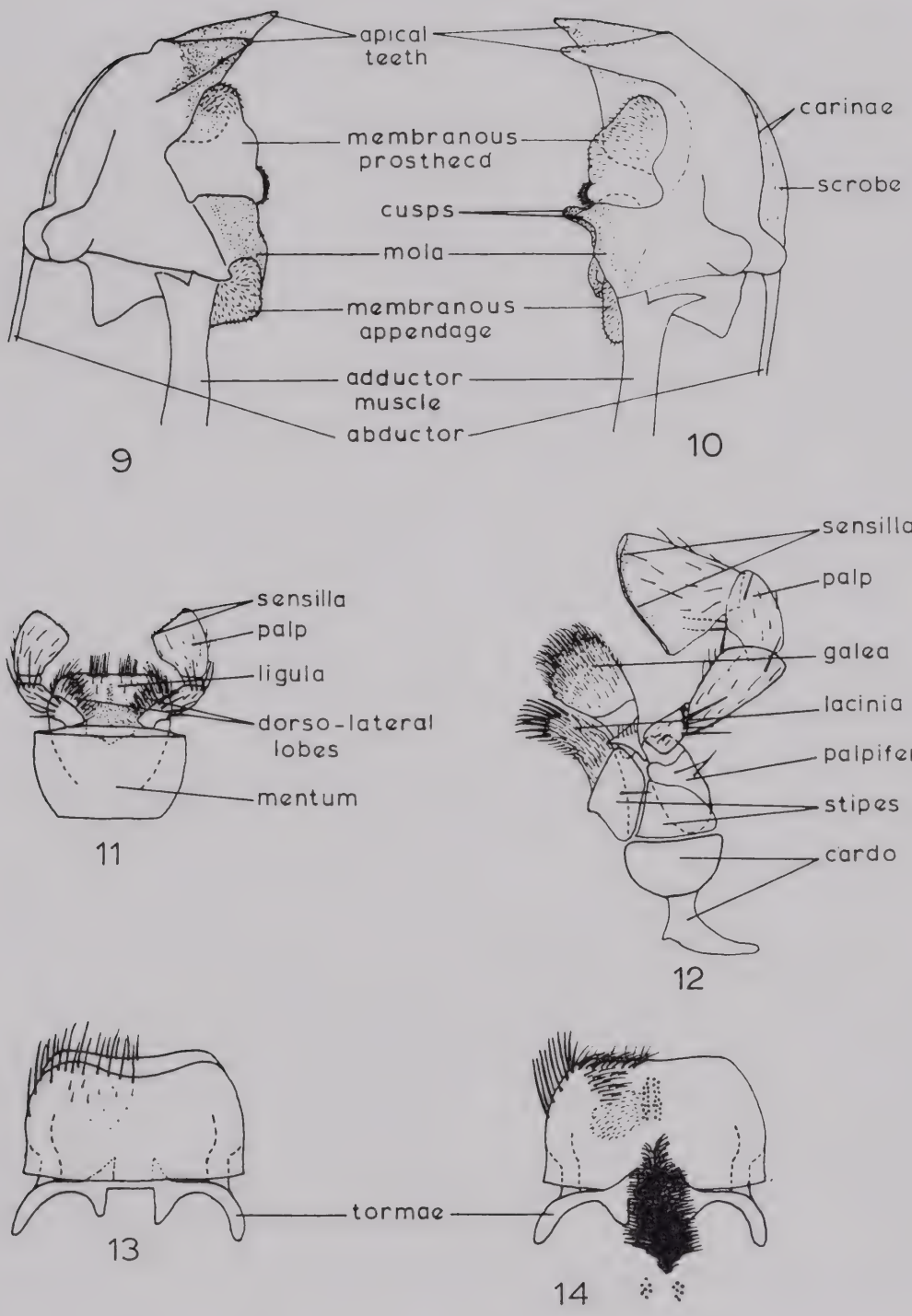
Metanotum. Wings functionless, vestigial, not exceeding about 4 mm in length. The bases of 2 veins only (presumably R and Cu) are distinguishable. A study of the wing venation of the fully winged *Pterohelaeus* might be of assistance in interpreting the vestigial venation of *Mimopeus.*

Metanotum shows considerable reduction compared with that of fully winged tenebrionids, as is general in flightless forms. Very short and transverse, over five times wider than long. Scutellum broadens considerably anteriorly. All sclerotised bars, struts etc. reduced or absent except for those between scutum and scutellum, which are greatly extended laterally.

Abdominal tergites and pleurites. All pleurites membranous. All tergites membranous except tergite 7, tergite 8, and in the male, tergite 9 (=proctiger of ovipositor in female). Tergite 7 is roughly the same shape in both male and female. The apex of tergite 8 is rounded in the female, but subtruncate in the male. Tergites 7 and 8 are covered densely with fine setae in both male and female.

Mouthparts (Figs.9-14). Labrum approximately as in Fig.13, truncate or emarginate anteriorly, dorsal surface bearing setiferous punctures near anterior margin, anterior setae moderately stout, others short and fine, all projecting forwards. Surface covered with very fine, irregular microsculpture. Epipharyngeal surface (Fig.14) densely setose anteriorly, these setae stout and directed towards mid-line, except those on anterior margin which extend straight forward. Setae absent from latero-posterior and posterior surfaces. Median area bears large punctures, on each side of which is an area of minute denticles directed towards it. Tormae as in Figs.13 and 14, and joined by transverse bar, not extensively fused with epipharynx.

Mandibles (Figs.9, 10) stout, asymmetrical. Scissorial and molar parts heavily sclerotised, black even in cleared KOH preparations. Outer dorso-lateral and ventrolateral edges sharply carinate. Scrobe between carinae bearing a few very fine and short setae. Apices of both mandibles bifid. Scissorial edge of right



Figs. 9-14. *Mimopeus elongatus*. Adult mouthparts. 9. Right mandible. Ventral view. 10. Left Mandible. Ventral view. 11. Labium, ligula partly retracted. Ventral view. 12. Left maxilla. Ventral view. 13. Labrum. Dorsal view (setae of right half omitted). 14. Epipharynx. Ventral view (setae of left half omitted).

mandible with a strong indentation, that of left slightly sinuate, scythe-shaped. Each mandible bears a membranous prostheca between scissorial and molar parts, that of right mandible rather larger than that of left. Prosthecae fill very deep indentations between scissorial and molar parts, that of the right mandible being larger. Molar surface of right mandible fairly regular, that of left irregular, with two prominent cusps at its distal edge, joined by a slightly lower transverse ridge. Proximal part of mola bearing a membranous, densely setose appendage.

Maxillae (Fig.12), symmetrical. Cardo, stipes (which is composed of two sclerites showing no signs of fusion, as in most tenebrionids) and palpifer finely, sparsely and irregularly punctate, each puncture bearing a very fine, short seta. The position and presence of the large stout setae appear to be fairly constant. Terminal segment of palp securiform.

Labium (Fig.13) with prementum somewhat retracted under mentum. Mentum bearing fine, rather sparse punctures, those of lateral depressions bear moderately long, stout setae, while those elsewhere bear very fine short setae. Basal and second segments of palpi each bear a ring of relatively long, stout setae near their apices, all segments bear smaller setae elsewhere. Apical margin of terminal segment bearing numerous small papilla-like sensilla. Ligula trilobed, densely setose on the areas shown in Fig.11 (the lateral lobes are dorsal in position, and their setae arise on the dorsal surface of the ligula). Submentum not distinguishable, fused with postgenae.

Ventral surface of head (Fig.5). There is disagreement concerning the terminology of 'sclerites' (topographical areas) of the head. Imms (1957) names the lateral and ventral regions of the head in Coleoptera (excepting the gula) the genae, and many coleopterists use the term in this sense. Snodgrass (1935, fig.67) refers to the ventral areas from the base of the maxillae backwards (excluding gula) as postgenae. This is also the nomenclature used by Koch (1955). In this revision the term postgena is used in the sense of Snodgrass and Koch to describe the ventrolateral surface behind the maxillae and lateral to the gula. The genae constitute the genal canthus, and the areas directly in front of, below and behind the eye (Fig.6).

Head shallowly constricted behind eyes and just in front of gula (Fig.5). Pregular region of postgenae distinctly emarginate at base of cardo, edge of emargination forming a distinct, usually rounded, marginal ridge, outer angle of maxillary emargination obtusely raised or (in *M. tibialis*) dentate. Pregular region usually moderately deeply and closely punctured, with micropunctures between macropunctures. Gular region of postgenae usually more finely punctured, with punctures in irregular transverse grooves. All the macropunctures bear fine setae, usually visible at 25 x magnification. Gula triangular, surface generally impunctate and shining, frequently with irregular transverse or longitudinal grooves or wrinkles.

Endoskeleton of head. Not studied in detail.

Ventral surface of prothorax (Fig.4). Prosternum as in Fig.4, generally finely punctate and shining, sometimes granulate, often more or less laterally rugose. Intercoxal process with distinct submarginal grooves, posterior projection bulbous, more or less prominent. 'Proepisternum' as in Fig.4 (pr.ep.), actually represents

the proepisternum and the deflexed part of the pronotum, which are completely fused together. Proepisternum finely punctate, each puncture bearing a short seta, interstices sometimes bearing small granules.

Ventral surface of mesothorax (Fig.4). Mesosternum considerably depressed anteriorly, depressed part bearing a median longitudinal ridge and more or less setose. Intercoxal process (Fig.30 more detailed than in Fig.4) moderately broad, finely punctate, with distinct submarginal grooves. Mesepisternum with similar sculpture and clothing to depressed part of mesosternum. Mesepimeron (m.epm.) closing mesocoxal cavity outwardly by its inner edge, smooth and finely punctate. Trochantins of mesocoxae exposed (Fig.73).

Ventral surface of metathorax (Fig.4). Metasternum short, about three times wider than long, intercoxal processes as in Fig.4, submarginal grooves near anterior and posterior edges. Median longitudinal suture extends about two fifths distance from posterior edge towards anterior edge. Finely punctate, lateral punctures bearing fairly long yellow setae, surface generally smooth with a few transverse and longitudinal wrinkles, sometimes with small granules. Mesepisternum and metepimeron smooth, shining, finely punctate, with short yellow setae.

Metendosternite (Watt 1974: 443,fig 43). This structure has been little considered in the systematics of Tenebrionidae. Crowson (1938, 1944) illustrates 5 species, all of which, however, appear to be either particularly primitive (*Tribolium*) or specialised. A fairly generalised type is that of *Tenebrio molitor* (Watt 1974, fig.43), which is used here as a basis for comparison.

Mimopeus opaculus and *M. elongatus* have been examined for the structure of their endoskeleton, and their metendosternites are as illustrated in Fig.8. In these, a stalk of moderate length is present. Arms fairly long, quite slender. Anterior tendons arise about half way between base and apex of arms. Ventral process of arms reduced, no "lamina" present. The same strengthening ridges of the arms are present as in *Tenebrio*, and the main differences are in the position of origin of the anterior tendons, in the relative proportions of the arms and stalk, and in the more greatly reduced ventral process of arm in *Mimopeus*. Note that in *Tenebrio* the anterior ridge joins the ventral flange at its apex, but in *Mimopeus* the junction is behind the apex.

The slight differences between the metendosternites of *M. elongatus* and *M. opaculus* may be due mainly to the difference in size of the beetles, or they may have some significance in intrageneric systematics.

Abdominal sternites (Fig.4.) Sternites 3-7 (i.e. first 5 visible sternites) heavily sclerotised. Intercoxal process of sternite 3 fairly broad and rounded anteriorly. Submarginal grooves present parallel to anterior margin of sternite 3 and near lateral margins of sternites 4 and 5, and usually of sternites 6 and 7. Each of these sternites bears macropunctures, fine setae and micropunctures. Intersegmental membranes visible between sternites 5 and 6 and between 6 and 7. Sternite 8 slightly sclerotised. In males apex emarginate. In females apex coming to a single, fairly blunt point. Ventral surface of sternite 8 in both sexes covered with fine setae, these are especially long on the apices in the male.

Aedeagus (Figs 15, 25-29,33-41,67,69,79-82,84,93,94,95,99,103,104). Koch (1955) has made the most extensive study of aedeagus in Tenebrionidae, and his morphological nomenclature has been followed in this study (Fig.15). The following terms are equivalents (cf. also Sharp & Muir 1912).
Apicale = apical piece of tegmen (i.e. fused parameres).
Basale = basal piece of tegmen.
Penis = median lobe of aedeagus.

In *Mimopeus* the aedeagus is not inverted as in many tenebrionids. When retracted into the abdomen the tegmen lies above the median lobe, and when extended the whole structure curves around beneath the abdomen, so that the tegmen lies beneath the median lobe (Fig.70.). In the shape and proportions of the aedeagus (see figures) there is considerable variation between and even within species (Figs.25-28), but all show the same basic structure.

On apicale, parameres barely separated at apex, sometimes fused almost to apex. Dorsal and lateral surfaces of apicale bear scattered fine sensory setae and sensilla. Inflected alae extend ventrally towards base for over half the length of basale and form, with the inflected alae of the latter, a fairly complete tube around the penis.

Sides of basale strengthened by fairly heavily sclerotised supports. Inflected alae extending entire length of basale, most extensive at about mid-length. There is an internal U-shaped slender ridge just distal to the basal margin, presumably providing attachmement for a muscle.

Penis simple, without lacinia. Base supported by lateral sclerotised pieces; dorsal surface membranous at the base, becomes sclerotised anteriorly, while sclerotised alae become inflected onto the ventral surface. Inner groove runs along

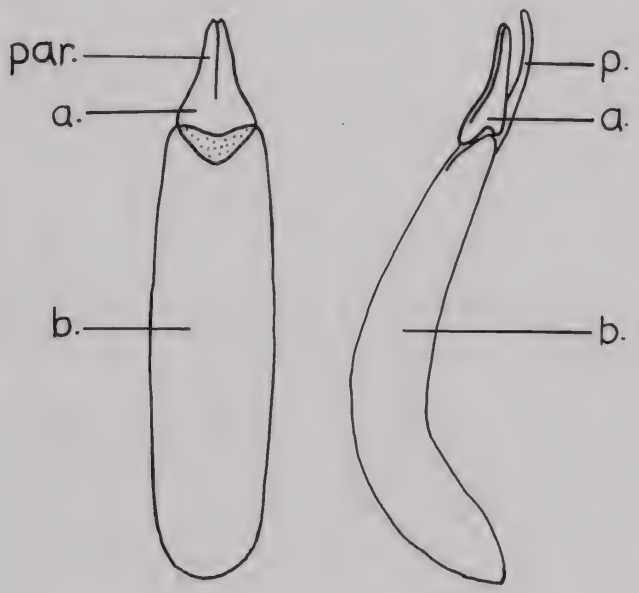


Fig.15. *Mimopeus opaculus*. Aedeagus. Left. Dorsal. Right. Lateral.
a. apicale, b. basale, par. paramere, p.penis.

the underside of the dorsal surface to apex. Upper and lower surfaces bear scattered microscopic sensilla (visible in cleared preparations under compound microscope at 100 × magnification).

Ovipositor. The ovipositors are not considered in detail at the specific level, in the present revision, but at the end of this description there is an indication of the characters subject to interspecific variation.

The female reproductive organs of Tenebrionidae have been neglected by systematists. It has been found necessary to establish a simple and accurate terminology to replace that of Tanner (1927) which is inaccurately applied, that of Blaisdell (1909) which is not generally accepted, and that of Lindroth & Palmen (1970), which is over-simplified (see Watt 1974).

The ovipositor of *Mimopeus* is a moderately elongate tube-like structure. The membranous base arises between tergite 8 and sternite 8, which in turn lie between tergite 7 and sternite 7. Tergite 7 and sternite 8 bear pubescence composed of fairly fine hairs, and the edge of tergite 8 bears a fringe of fine hairs. Sternite 8 is bluntly pointed apically. Its anterior edge bears a Y-shaped anterior extension, the spiculum gastrale. The intersegmental membrane arising between tergite 8 and sternite 8 comprises almost half the length of the extruded ovipositor. At its distal end arise 3 plates, a dorsal proctiger and two lateral paraprocts. The distal end of the proctiger bears a fringe of setae. Each paraproct is strengthened by a rod (baculum) running parallel to its ventral border. Arising between the paraprocts are a pair of fairly heavily sclerotised coxites each bearing a small stylus in a small hollow on its dorso-lateral surface near its apex. Each stylus bears two fine setae. Setiferous punctures are present in a longitudinal hollow on the dorso-lateral surface of each coxite, and a few fine setae are present on lateral and ventral surfaces. Ventrally each coxite bears two transverse shallow sulci, neither of which extends onto the dorsal surface. Apparently the ventral part of the base of each coxite represents the valvifer (Mr R.A. Crowson, *pers.comm.*), but the division is not at all obvious in *Mimopeus*, although clearly visible in some other Tenebrionidae (*Uloma*). Beneath the proctiger and lying above the bases of the coxites is the anal membrane containing the anus. The walls of the rectum are sclerotised and thickened longitudinally, and are visible in cleared preparations. The vulva opens between the apices of the coxites.

A few setiferous punctures at present near the apices of the paraprocts. The chaetotaxy is not described in detail as the positions and number of setiferous punctures of one side differ from those of the other side of the same specimen.

The ovipositor of *M. opaculus* is very similar to that of *M. elongatus*, differing mainly in the proportions of the coxites (which are relatively stouter) and of the proctiger (which is more sharply acuminate). Other species differ in these characters and in size of styli, length and stoutness of setae, and relative dimensions of other sclerites. The position of the ventral sulci of the coxites varies. They are closer together in *M. rugosus* and *M. convexus* than in other species.

Comparison of characters. Some of the above-described morphological characters are compared for all species and various populations in Table 3.

Dimensions (cf. also Table 4). Length: 8.2-25.3 mm.
Width (of elytra): 4.2-12.8 mm.

Distribution. Confined to New Zealand.

Table 3: Comparison of morphological characters in species of *Mimopeus*.

CHARACTER NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
elongatus Northland	s	x	x	m	s	x				x	x					x			x			
elongatus West Coast		x	x			x				x	x					x			x			
elongatus Cook Strait		x	x		s	x				x	x					x			x			
neglectus		x	x	x		x				x	x					x			x			
elongatus Otago-Southland		x				x				x	x					x			x			
turbotti	x	x	x	x	x	x				x	x					x						
pascoei			x		x	x				x	x					x						
subcostatus		x	x		x	x				x					x		x			x		
humeralis		x	x	x	x	x			x			x	x			x				x		
thoracicus		x	x	x	x	x			x			m	x			m	f			x		
vallis		x	x	x	x	x			x							x			x			
parvus			x	x	x	x			x							x			x			
parallelus			x	x	x				x			x	x		x	x				x		
buchanani		x	x	x	x	x			x								x				x	
lateralis	x	x	x	x	x	x			x								x			x	x	
opaculus Central North I and South I	f	x	s	x	f	f		x			x						x				x	
opaculus Banks Pen.		x	x	x				x			x						x					
opaculus Cook Strait			x	x				x			x						x					
opaculus Cuvier I	x	x	x	x	x	x		x			x						x				x	
opaculus Waiheke I (?)		x	x	x				x			x						x					
opaculus Inland Southland					x	x		x			x					x						
insularis					x	x		x			x						x				x	
impressifrons Central Otago			f			x		x			x					x			x			
lewisianus						x		x									x		x			
costellus		x	x	x	x	x		x				x	x		x			x		x	x	
clarkei		x	x	x		x		x				x			x		x			x	x	
granulosus		x	x	x	x	x			x			x	x		x			x		x	x	
tibialis						x				x		x		x			x		x			x
convexus						x	x					x		x	x		x		x		x	
rugosus					x	x	x					x		x	x			x	x		x	

FINAL INSTAR LARVA

On a superficial level, larvae of *Mimopeus* are very difficult to distinguish from each other specifically. The following description is based on larvae of two species only *M. elongatus* and *M. opaculus*. This covers two of the three species groups here recognised, but may have to be modified slightly when the larvae of the other species are known. The description is confined mainly to characters considered by van Emden (1947) to be of generic or tribal importance.

Body elongate, cylindrical, fairly heavily sclerotised. Head dark brown, remainder of body yellowish to dark brown.

Head. Labrum with 2 long discal setae, 2 long lateral setae and 2 pairs of shorter setae within outer angle. Mandible with a dorso-lateral elevation bearing a pair of stout setae. Frontoclypeus bearing anteriolaterally on each side a pair of stout setae, and one more slender seta on each side near basal margin. Ocelli small with one pair on each side. Antennae 2 - segmented. Mouthparts of typical tenebrionid type, maxillary mala with a spur towards apex of inner edge. Epicranial suture faint. Genae and postgenae bearing numerous setae.

Key to Table 3

X Character exhibited by **all** members of relevant species.
M Character exhibited by **most** members (> 70%)
S Character exhibited by **some** members (30-70%)
F Character exhibited by **few** members (< 30%)

1. Granules visible at 25x magnification present on pronotum.
2. Granules visible at 25x magnification present on elytra.
3. Granules visible at 25x magnification present on prosternum.
4. Granules visible at 25x magnification present on epipleuron.
5. Pronotal microsculpture visible at 25x magnification.
6. Elytral microsculpture visible at 25x magnification.
7. Aedeagus of *rugosus* type.
8. Aedeagus of *opaculus* type.
9. Aedeagus of *granulosus* type.
10. Aedeagus of *intermediate* type.
11. Base of elytra rounded.
12. Base of elytra marked by distinct raised carina.
13. Elytra shoulder prominent narrowly rounded.
14. Outer angle of anterior tibia dentate (approximately as in fig.)
15. Elytral costae plainly visible to naked eye.
16. Pronotal punctation of *humeralis* type.
17. Pronotal punctation of *opaculus* Banks Pen. type.
18. Pronotal punctation of *granulosus* type (coarse, steep-sided, fig.)
19. Elytral submarginal channel narrower than in *humeralis*.
20. Elytral submarginal channel inner angle distinct.
21. Setae of discal elytral punctures visible at 25x magnification.
22. Maxillary emargination dentate laterally.

Table 4. Dimensions for species and distinct populations of *Mimopeus*.

Species and distinct populations of *Mimopeus*	LENGTH mm Min.	Max.	WIDTH mm Min.	Max.
elongatus Northland	8.8	13.8	4.4	7.6
West Coast	9.2	12.3	4.7	6.1
Cook Strait	9.2	11.8	4.9	6.3
neglectus	8.9	11.4	4.8	6.2
elongatus Otago-Southland	8.6	10.0	4.5	5.3
turbotti	11.5	14.9	6.4	7.8
pascoei	9.8	14.2	5.4	7.9
subcostatus	9.1	11.2	4.7	6.2
humeralis	9.6	12.0	4.8	6.2
thoracicus	8.2	10.9	4.5	5.8
vallis	8.7	11.3	4.3	5.9
parvus	8.2	11.3	4.2	5.6
parallelus	8.8	11.8	4.8	6.1
buchanani	10.0	16.0	4.9	9.4
lateralis	11.1	14.7	6.1	7.6
opaculus South I	14.1	17.6	7.3	10.2
Otago	13.1	17.9	7.2	9.8
Stewart I	13.6	16.3	8.0	9.1
Central North I	14.0	18.5	7.2	11.2
Banks Pen.	15.0	19.7	7.8	10.2
Cook Strait	18.5	22.8	10.1	12.8
Waiheke I (?)	13.8	16.3	6.8	8.3
Cuvier I	16.6	19.2	8.9	10.0
insularis	19.6	22.8	9.3	11.4
impressifrons Central Otago	10.9	15.4	5.4	8.3
lewisianus	12.8	14.7	6.6	7.8
costellus	13.6	17.2	7.1	8.9
clarkei	10.6	14.2	5.7	7.0
granulosus	10.1	13.1	5.2	6.7
tibialis	10.4	14.2	5.6	7.6
convexus	11.0	14.4	5.5	7.6
rugosus	10.7	12.6	5.4	6.6

Thorax. Pronotum elongate, bearing 4 prominent setae, the first 2 on lateral slope near anterior edge, the second 2 on lateral slope near posterior edge. Mesonotum and metanotum each with 2 prominent setae in line with those of pronotum. A second row with the same number of setae as the upper row runs along the lower lateral slopes of the nota. Sternites bear a few small setae laterally.

Front legs stout, all parts at least twice as long as mid and hind legs. All coxae bearing numerous setae anteriorly and posteriorly, femora and tibio-tarsi bearing spines on inner edge and setae on outer surface.

Abdomen. First abdominal sternite bearing about 10 setae on each side near anterior margin, and a single pair, one on each side, near posterior edge. Segments 2 - 8 each with one pair of setae near posterior margin of tergite, and 2 pairs, one anterior and one posterior, on each sternite.

Anus and anal tubes at base of ninth segment. Ninth segment (see Fig.105) sternite very short, bearing a number of short and 4 long setae. Dorsal part of ninth tergite convex, bearing 4 long setae near its anterior border, 4 long setae on the posterior edge and 4 short spines, 2 between the outer pair and 2 between the inner pair of long setae. Ventral part of ninth tergite bearing 7 long slender setae on each side.

Dimensions. Head width: 2.7 (*elongatus*) — 3.6 mm (*opaculus*).

KEY TO SPECIES OF *MIMOPEUS*

1 Aedeagus as in Figs.103-104, apicale very slender, basale relatively stout. Basal elytral carina raised, sharp. Outer angle of anterior tibiae strongly dentate (Fig.101). Elytral costae usually plainly visible to naked eye. Elytral submarginal channel very narrow and poorly defined ..... RUGOSUS SPECIES GROUP 2

Aedeagus not as in Figs.103-104, apicale not as slender 3

2 Elytral costae very distinct (Fig.48). Pronotal, elytral and sternal punctures very large, deep and steep-sided. Hairs of elytral punctures stout, projecting well beyond borders of punctures on lateral and hind slopes, clearly visible at 25 x magnification. Colour dull reddish grey. South Canterbury, Otago, Southland ..... **rugosus**

Elytral costae not very distinct. Pronotal, elytral and sternal punctures relatively small and shallow. Hairs of elytral punctures very fine and short, usually not visible at 25 x magnification. Colour shining dark reddish black. Fig.96. Mackenzie Basin, South Canterbury ..... **convexus**

3 Outer apical angle of anterior tibia sharply dentate (Fig.100,t), with a distinct "sinus" (s) between the tooth and the basal articulation of the tarsi. Lateral angle of postgenal emargination at base of cardo dentate (Fig.97). Aedeagus moderately stout (Fig.99). Basal elytral carina raised, sharp. Elytral submarginal channel obsolete. Form convex. Canterbury ..... TIBIALIS SPECIES GROUP **tibialis**

Outer apical angle of anterior tibia not sharply dentate, tibial apex lacking a distinct "sinus" (Figs.85, 102), lateral angle of postgenal emargination not dentate 4

4 In lateral view dorsal surface of apicale of aedeagus distinctly concave (cf.Figs.79-82, 84, 93). Basale of aedeagus stout in dorsal view, not strongly tapered or sinuate. Usually large beetles exceeding 14mm in length and 7.5mm in width *and/or* elytral costae clearly visible to naked eye *or* elytral submarginal channels absent. 5

In lateral view dorsal surface of apicale of aedeagus convex or flat, never distinctly concave. Basale of aedeagus slender (usually) *or* strongly tapered *or* sinuate in dorsal view 10

5 Base of elytra rounded off, not represented by a sharp edge. Shoulder broadly rounded, not prominent (Figs.56-64). Inner angle of elytral submarginal channel not distinct ..... OPACULUS SPECIES GROUP 6

Base of elytra represented by a sharp edge, often in the form of a raised carina. Shoulder narrowly rounded, moderately prominent (Fig.20). Inner angle of elytral submarginal channel distinct..... ..... GRANULOSUS SPECIES GROUP (part) 9

6 Elytral costae clearly visible to naked eye. Elytral shoulder very broadly rounded, almost obsolete (Fig.57). Convex. Elytra distinctly wider than pronotum. Aedeagus as in Fig.82. Submarginal channel of elytra sloping downwards, not flat. Poor Knights Islands, North Auckland ..... **insularis**

Elytral costae not clearly visible to the naked eye, often obsolete. Elytral shoulder not as broadly rounded (Figs. 56, 58-64) 7

7 Elytral submarginal channels very narrow or absent. Form moderately convex, elongate oval. Punctation usually fine and shallow, discal pronotal and elytral punctures often separated by more than 2 x their own diameter (Figs. 84, 85). Mackenzie Basin and inland Otago. ..... **impressifrons**

Elytral submarginal channels relatively broad. Form fairly flattened, broadly oval (Figs. 56, 58-64) 8

8 Apicale of aedeagus more elongate (Figs.73-81, cf. also Figs.24, 83, 86-92). Pronotal punctures larger and deeper, those of disc separated mostly by about their own diameter. North Island, excluding extreme north; South Island east of main divide; Stewart Island ..... **opaculus**

9 Large granules present on elytron, especially on lateral and hind slopes, clearly visible at 25 x magnification. Dorso-lateral and ventro-lateral angles of apicale rounded, not carinate. Macropunctures large, deep, and steep-sided, rarely separated by more than their own diameter on pronotum. (Figs.51, 93) South Marlborough and north Canterbury ..... **costellus**

Granules absent from elytra. Dorso-lateral and ventrolateral angles of apicale carinate at base. Macropunctures smaller and less steep-sided; rarely separated by less than their own diameter on pronotum. Known only from Mt. Percival, north Canterbury ..... **johnsi**

10 Macropunctures of pronotum and elytra large, deep and steep-sided; separated by less than their own diameter (Figs.20, 54). Elytral costae clearly visible to naked eye Banks Peninsula .... GRANULOSUS SPECIES GROUP **granulosus**

Macropunctures of pronotum and elytra smaller (often very small), usually separated by more than their own diameter (Figs.16-19, 47, 49, 54). Elytral costae rarely visible to naked eye ..... ELONGATUS SPECIES GROUP 11

11 Discal elytral punctures bearing hairs visible at 25 x magnification. Form broadly oval, fairly flat (Fig.52). Punctures of pronotum and elytra moderate, approximately as in *M. opaculus* (Fig.23). Dorsal microsculpture strong. Shoulders narrowly rounded. Base of elytra sharply marked but not raised ..... BUCHANANI SUPERSPECIES 12

Discal elytral punctures not bearing hairs visible at 25 x magnification. Form usually elongate oval, convex (Figs. 16, 47). Other characters not all present in combination 13

12 Granules visible at 25 x magnification on pronotum, at least laterally. Inner angle of elytral submarginal channel distinct. (Figs. 45, 52, 66). South Marlborough, Canterbury ..... **lateralis**

Granules visible at 25 x magnification absent from pronotum. Inner angle of elytral submarginal channel completely obsolete. (Figs. 65, 67, 68). Vicinity of Wellington city, Cook Strait islands, northern Marlborough, east Nelson ..... **buchanani**

13 Elytral shoulder narrowly rounded (Figs. 46, 47, 49), often prominent. Base of elytra sharply marked, often represented by a raised carina. Aedeagus slender and small ..... HUMERALIS SUPERSPECIES 14

Elytral shoulder broadly rounded (Figs. 16-19, 42, 43), not prominent. Base of elytra usually rounded off, very rarely marked by a raised carina. Aedeagus usually relatively stout ..... ELONGATUS SUPERSPECIES 18

Basale of aedeagus tapering considerably in dorsal view apicale very small and slender (Fig.28). Wellington south coast, Wairarapa Hawkes Bay, Marlborough ..... **neglectus**

14 Elytral costae plainly visible to naked eye, separated by rows of irregular foveae composed of confluent punctures (Fig.55). Interstices between elytral punctures highly polished, microsculpture very weak, scarecely visible at 100 x magnification. Lower Clarence Valley, Marlborough ..... **parallelus**

Elytral costae not, or scarcely, visible to naked eye; elytral punctures discrete, not running together to form foveae. Elytral interstices dull, microsculpture visible at 25 x magnification 15

15 Aedeagus relatively large and not very slender (Figs. 40, 41). Basal carina of elytra not raised at all. Shoulder not prominent (Fig.49). Submarginal channels of elytra very narrow, inner angle obsolete 16

Aedeagus smaller or very slender (Figs. 35, 38). Basal carina of elytra raised. Shoulder prominent (Figs. 47, 50). Submarginal channels of elytra broader, inner angle distinct 17

16 Granules, clearly visible at 25 x magnification, present on elytra. Dorsal microsculpture very strong, visible at 10 x magnification. Punctures rather deep and steep-sided. Awatere Valley, Marlborough, from Upcot northwards ..... **vallis**

Granules absent from elytra. Dorsal microsculpture not visible at 10 x magnification. Punctures shallower and not as steep-sided. Molesworth, Awatere Valley, and Mt Percival, near Hanmer ..... **parvus**

17 Aedeagus elongate and very slender (Fig.35). Form of body elongate, parallel-sided (Fig.47). Wellington southern coasts ..... **humeralis**

Aedeagus less elongate and relatively stouter (Fig.38). Form of body more broadly oval, less parallel-sided (Fig.50). South Marlborough, Canterbury, Otago, mainly coastal ..... **thoracicus**

18 Elytral submarginal channels distinct and broad to beyond mid-length, epipleural carina reflexed outside them (Figs. 22, 42-45). Chatham Islands ..... **pascoei**

Elytral submarginal channels indistinct and usually narrow, inner angle completely obsolete, epipleural carina not or barely reflexed (Figs. 16-19, 21)..... 19

19 Aedeagus as in Fig.29. Granules clearly visible at 25 x magnification present on pronotum. Submarginal channels of pronotum and elytra broad. Three Kings Islands..... **turbotti**

Aedeagus not as in Fig.29 (cf.Figs. 3, 25-28, 30-32). Granules usually absent on pronotum or very small. Submarginal channels of elytra narrow, those of pronotum usually narrow and indistinct. Coastal North Island, South Island excluding Canterbury, Stewart Island ..... **elongatus**

Mimopeus neglectus sp.n. (Figs.18,28)

Like *M. elongatus* this species is coastal around part of the coast of the North Island. Watt (1961) regarded it as a sub-species of *M. elongatus* but there is a constant morphological gap between the two taxa which is best formally recognised by regarding *neglectus* as a full species.

Distinguished from *M. elongatus* in the structure of the aedeagus which in *M. neglectus* is more strongly acuminate apically (Fig.28). It is distinguished from *M. humeralis*, with which it occurs sympatrically and with which it was frequently confused in collections, by the stout, less elongate aedeagus, shining pronotum, broadly oval form, broadly rounded elytral shoulders, complete absence of carinae at the elytral bases and narrower and less clearly defined sub-marginal channels (Fig.18).

MALE

Elongate oval, convex (fig.18), colour reddish brown or reddish black, undersurface shining reddish brown to reddish black.

Dorsal surface. Antennae similar to fig.7, basal segments covered with stout semi-erect setae, which become shorter and finer towards the apex. Terminal three segments bearing fine, whitish pubescence, microsculpture of surface strong and irregular, clearly visible at 25x magnification; other segments shining, microsculpture visible at 100x magnification. Labrum emarginate, finely punctate, each puncture bearing a moderately long yellow seta. Head similar to fig. 3, eyes generally extending slightly further laterally than genae, clypeus emarginate anteriorly, clypeal sutures indistinct, frons slightly depressed behind clypeus. Upper surface of head finely punctured, punctures shallow, with gently sloping slides, interstices smooth, bearing some small micropunctures just visible at 100x magnification, microsculpture weak, visible at 100x magnification. Punctures become smaller towards front and lateral margins of head.

Pronotum moderately convex, individually variable in shape, sometimes without the sinuation before the posterior angles, when distance across posterior angles is less. Punctures of pronotum small and shallow, with gently sloping sides, sparse on disc, separated by more than twice their own diameter, more closely set towards base and marginal channels. Micropunctures barely visible at 100x magnification. Interstices smooth and shining, microsculpture weak, visible at 100x magnification; a few small raised dome-shaped granules present in submarginal channels. Scutellum triangular strongly transverse. Base of elytra rounded off. There are small shining granules on disc visible at 100x magnification. Epipleural carina distinctly upturned outside marginal channel at shoulder.

Ventral surface. Punctures of postgenae small and shallow, gular with transverse furrows very shallow and obscure. Prosternal granules very small. Submarginal grooves of fourth visible abdominal sternite almost obsolete.

Aedeagus (Fig.28). Aedeagus long and slender with apicale tapering strongly to apex as in figure.

FEMALE

Like male, but legs shorter and more slender, often difficult to distinguish without dissection.

DIMENSIONS

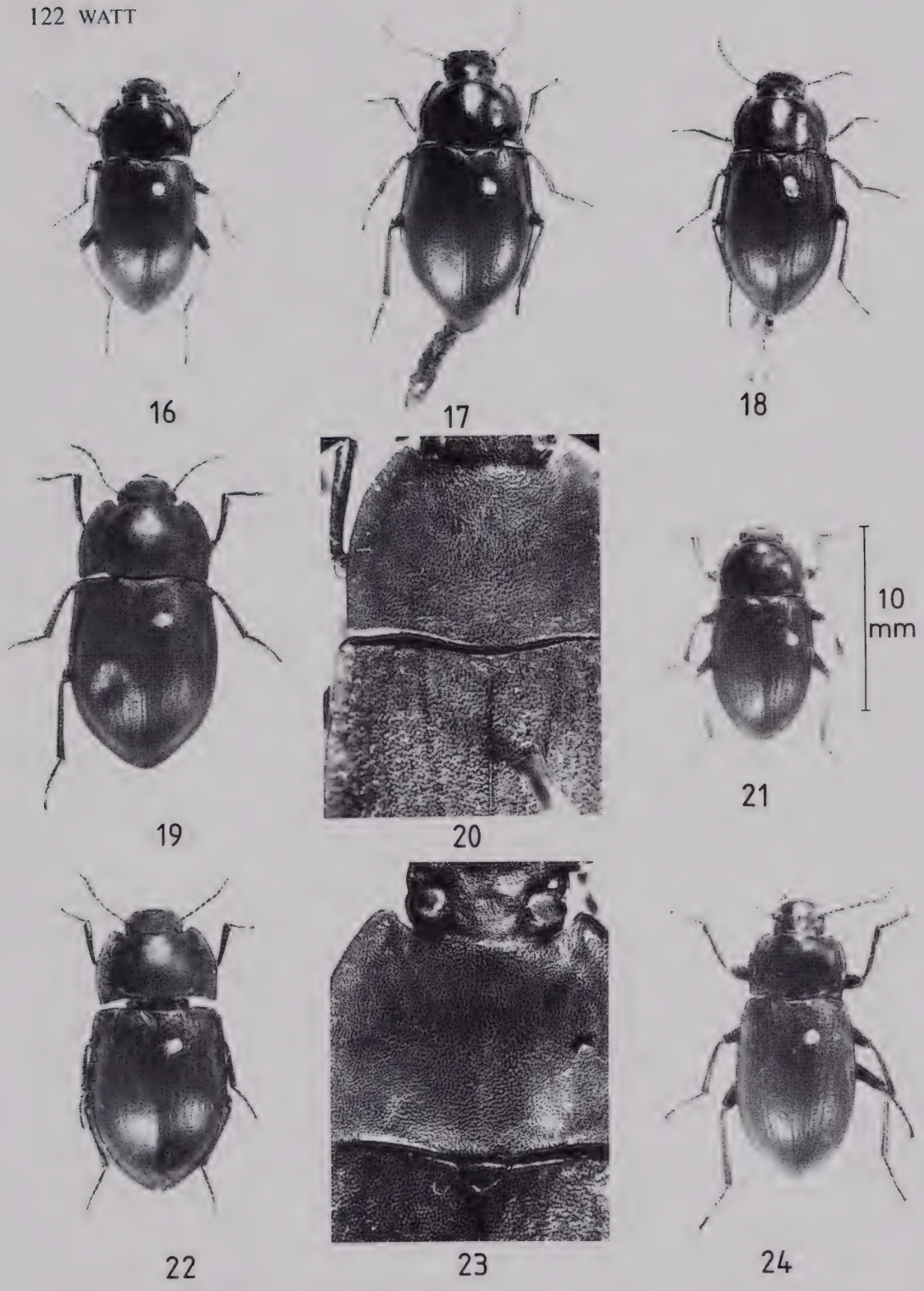
Length 10.0 mm, width 5.2 mm.

TYPE MATERIAL. Holotype ♂. Sinclair Head, Wellington 25 April 1942 C.E. Clarke, C.E.C./AMNZ. Allotype ♀ with same data as holotype, C.E.C./AMNZ Paratypes (9) with same data as holotype, C.E.C./AMNZ. Paratypes (6) with same data as holotype, C.E.C./BMNZ. Paratypes (3) Red Rocks, Wellington 29 August 1941, R.R. Forster, NMNZ. Paratypes (8) Red Rocks, Wellington under *Coprosma acerosa* 5 January 1959 J.C. Watt, J.C.W./NZAC.

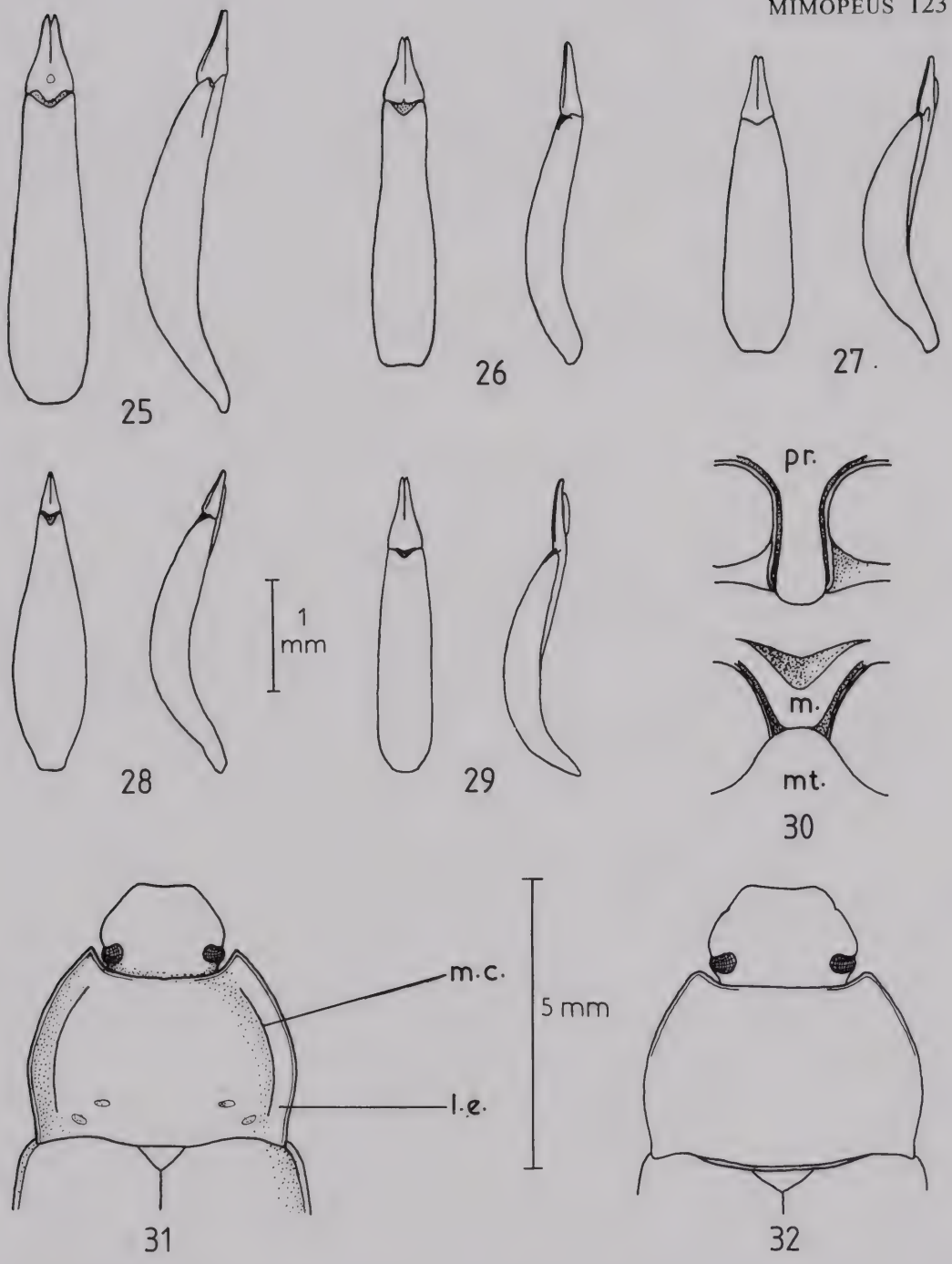
TYPE LOCALITY. Sinclair Head, Wellington.

Material examined. Holotype ♂allotype ♀, 26 paratypes, other specimens.

Distribution. Wellington: Red Rocks, Sinclair Head, Lyall Bay, Wilton's Bush, Makara Beach, Mana Island, Hutt Valley, Lowry Bay, Muritai, Pencarrow, Lake Wairarapa, Castlepoint. Hawkes Bay: Hastings, Rissington, Napier Beach, near Mahia Beach. Marlborough: Mouth of Wairau River, Kaikoura, Picton.
Ecology. Coastal Wellington from Makara eastwards, Wairarapa, Hawkes Bay.



Figs. 16-24. *Mimopeus* spp. 16. *M. elongatus*, West Coast form. 17. *M. elongatus*, Whangaruru South. 18. *M. neglectus*, Red Rocks, Wellington. 19. *M. turbotti*, Three Kings Islands. 20. *M. costellus*, Loburn. 21. *M. elongatus* (huttoni) Otago. 22. *M. pascoei*, Chatham Islands. 23. M. opaculus, Central North Island form. 24. *M. opaculus*, Inland Otago form.



Figs.25-32. *Mimopeus* spp. Head and thorax, and aedeagus. 25. *M. elongatus,* Bay of Islands. Aedeagus. 26. *M. elongatus,* Bethells Beach. Aedeagus. 27. *M. elongatus,* Stephens I. Aedeagus. 28. *M. elongatus,* Red Rocks Wellington. Aedeagus. 29. *M. turbotti,* holotype male. Aedeagus. 30. *M. elongatus,* Bay of Islands. Ventral view of prothorax and mesothorax, legs omitted. 31. *M. elongatus,* West Coast form Pararaha. Head and prothroax, male. 32. *M. elongatus,* Mt Mangere. Head and prothorax, male.

pr. prothorax, m. mesothorax, mt. metathorax, m.c. marginal channels of pronotum, l.e. lateral expansion of sides of pronotum.

This species is often found under *Muhlenbeckia complexa* and occurs in fairly large numbers under several other coastal plants, marram grass, *Spinifex*, *Pimelia* sp., *Coprosma acerose*, *Disphyma australe* and *Hymenanthera crassifolia*.

Mimopeus turbotti sp.n. (Figs.19,29)

Most closely related to *M. elongatus*, readily distinguished form all known populations of the latter by the structure of the aedeagus (Fig.29), larger size, and broader form (Fig.19).

MALE

Broader and less convex than *M. elongatus*. Upper surface dull black, legs and antennae reddish black, undersurface shining black.

Dorsal surface. Labrum slightly emarginate anteriorly, punctures larger and deeper than in *M. elongatus*, yellow setae stout. Dorsal surface of head as in *M. elongatus* but punctures deeper and microsculpture of interstices very strong, clearly visible at 25 x magnification.

Pronotum (Fig.19) more transverse than in *M. elongatus* almost as broad as elytra, anterior and posterior angles blunter, apex more deeply emarginate, submarginal channels distinct, expansions outside them very broad and more strongly reflexed than in *M. elongatus* West Coast populations. Pronotal punctures larger, deeper, and more steep-sided than in *M. elongatus*, those of disc sparse, separated by more than twice their own diameter. Very few small punctures visible on interstices, most being replaced by granules, visible at 25 x magnification.

Scutellum triangular, transverse, finely and deeply punctate.

Elytra broader and less convex than in *M. elongatus*, submarginal channels broader, particularly at shoulder, which is broadly rounded as in *M. elongatus*. Punctures deep, rather steep-sided, separated by at least their own diameter, often by twice their own diameter, interstices bear distinct shining granules, larger than those of pronotum, elsewhere microsculpture strong, clearly visible at 25 x magnification. Costae are lacking, but there are irregular linear depressions visible with side-lighting.

Ventral surface. Mentum as in *M. elongatus*. Pregular region of postgenae more deeply and closely punctured, gular region finely punctate, interstices with a few small granules, setae of punctures stouter than in *M. elongatus*. Gula with very fine transverse striae just visible at 25 x magnification, and with a few broad, indistinct, transverse depressions.

Prosternal intercoxal process broader posteriorly than in *M. elongatus*, prosternum bearing a few small granules. Proepisternum with strong microsculpture, finely punctate, outer margins distinctly reflexed so that prothoracic margin is more distinctly foliate than in any other species of the genus.

Mesosternal intercoxal process narrower than in *M. elongatus* submarginal grooves very indistinct. Metasternum finely punctate, interstices without granules, metepisternum more deeply punctured than metasternum. Abdominal sternites shining, slightly rugose longitudinally, finely punctured. Distinct submarginal grooves present on all except first visible sternite.

Epipleura of elytra with strong microsculpture, bearing scattered granules visible at 25 x magnification.

Legs. As in *M. elongatus*.

Aedeagus (Fig.29). Slender, smaller than in most populations of *M. elongatus*. In dorsal view basale parallel-sided, apicale slender and relatively elongate. Slender in lateral view, not strongly curved, apicale arched.

FEMALE

Like male, often slightly broader, averaging larger, but very difficult to distinguish without dissection.

DIMENSIONS (Tables 1,2)

Range. Length 12.2-15.8 mm, width 5.8-8.2 mm.

TYPE MATERIAL. Holotype ♂. Great Island, Three Kings Islands, 3.v.46, E.G. Turbott. Eastern division, under stones near Quadrats I & II, AMNZ. Allotype ♀ with same data as holotype, AMNZ. Paratypes with same data as holotype, (30) AMNZ; (2) BMNH; (2) CMNZ; Great Island, 1.v.1946, E.G. Turbott, under large stones with *Placostylus bollonsi*, seaward slopes above Crater Head, (10) AMNZ; (2) NMNZ; (2) NZAC. Big King I., C. Fleming, (3) A.E. Brookes Coll./NZAC.

TYPE LOCALITY. Great Island, Three Kings, ca. 40.2 km (25 miles) north-west of Cape Reinga.

Material Examined. Holotype ♂, allotype ♀, 51 paratypes, 85 other specimens.

Distribution and Ecology. Confined to the Three Kings Islands, where it occurs on Great Island and South West Island. Common under stones and fallen branches and adults common on ground at night. Larvae occur in friable soil rich in humus and occasionally in dry rotten wood.

This species is named in honour of Mr E.G. Turbott, former Director of Auckland Museum and a member of the Hauraki Gulf Maritime Park Board, who collected the majority of the extensive collection of Three Kings Is insects in the Auckland Museum.

Mimopeus insularis sp.n. (Figs.57,72,82)

Most closely related to *M. opaculus*.

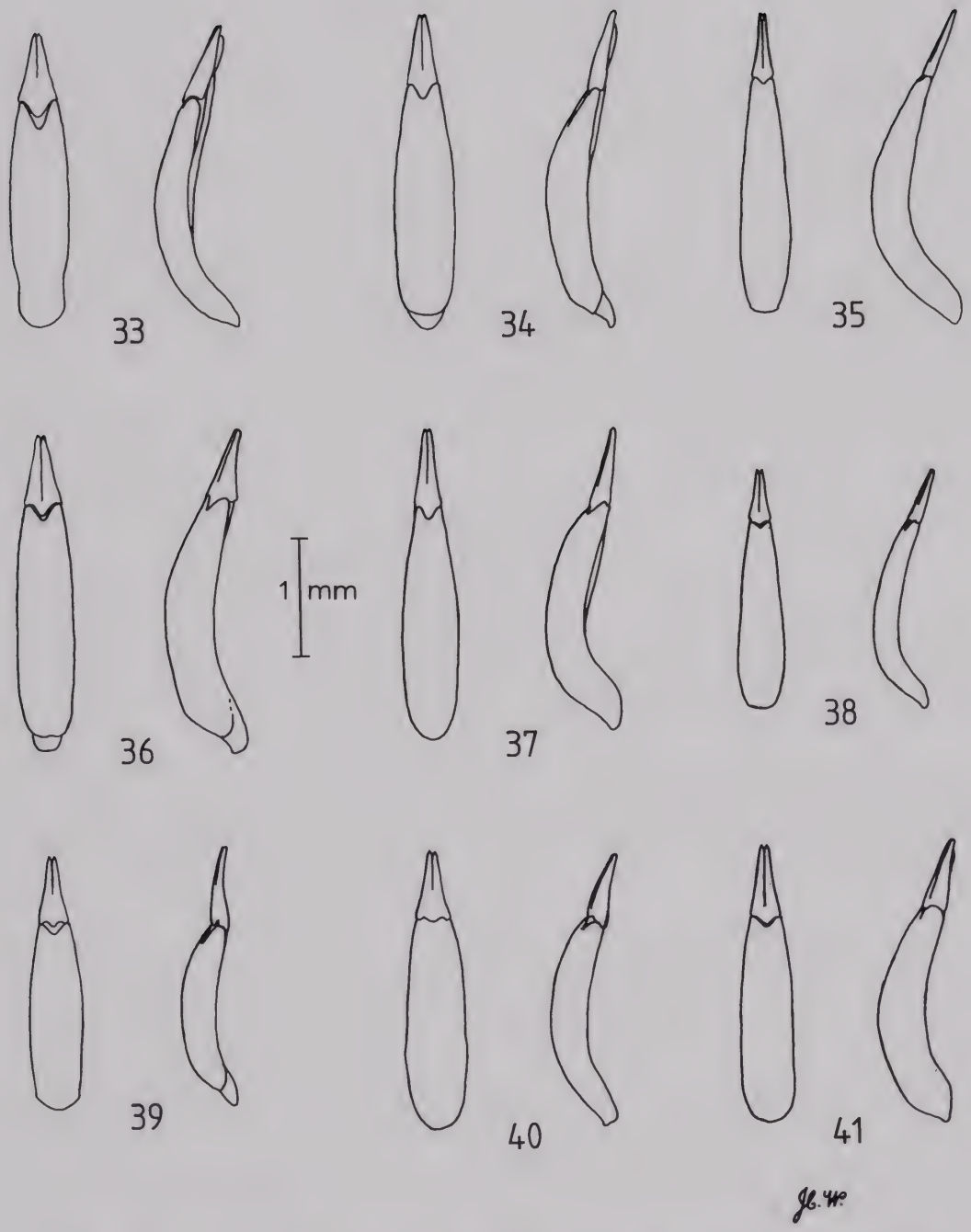
MALE

Colour dull greyish or reddish black, undersurface shining black.

Dorsal surface. Antennae similar to those of *M. opaculus*, terminal segment noticeably longer than broad, and yellow pubescence of last 4 segments denser. Labrum barely subtruncate anteriorly (Fig.72), not emarginate as in *M. opaculus* (Fig.71). Clypeus emarginate anteriorly, punctures as in *M. opaculus* clypeal suture distinct. Eyes relatively large, more prominent laterally than genal margin, with a more or less distinct transverse impression on the front between them. Punctures of front and vertex shallow.

Pronotum convex, anterior emargination shallow, sides strongly curved. Lateral based depressions present. Punctures, especially of disc, shallow with gently sloping sides. In any particular region there are approximately the same number of punctures as in *opaculus* per unit area. Interstices between punctures flat, bearing strong microsculpture which is, however, so fine that it is barely visible at 25 x magnification.

Scutellum triangular, transverse, with small, shallow punctures.



Figs.33-41. *Mimopeus* spp. Aedeagus. 33. *M. pascoei*, Glory Bay, Pitt I, Chathams. 34. *M. pascoei*, Forty fours, Chathams. 35. *M. humeralis*, Sinclair Head. 36. *M. pascoei*, Sisters, Chathams. 37. *M. subcostatus*, Chathams. 38. *M. thoracicus*, Christchurch. 39. *M. parallelus*, holotype. 40. *M. parvus*, holotype. 41. *M. vallis*, holotype.

Elytra oval, sides more strongly curved than in any populations of *M. opaculus*, relatively narrower at shoulders and wider at mid length. More convex than in *opaculus* lateral slopes steep, sides slope down to epipleural carina and position of obsolete submarginal channel is barely indicated. The three primary costae are present as well developed, rounded ridges, while there are traces of secondary costae, one between each primary costa. Large punctures shallow, with sides rather steeper than those of pronotum, small punctures very shallow. Interstices quite flat, microsculpture strong. Punctures become almost obsolete on surface of submarginal "channel". Dorsal surface lacks granules.

Ventral surface. Mentum transverse, punctures distributed as in *M. opaculus* but smaller and shallower. Area between maxillary base and gula with a few indistinct punctures, compared with *M. opaculus* in which the punctures are distinct. Punctation of remainder of undersurface of head similarly sparse and shallow. Gula relatively broader than in *M. opaculus*.

Prosternum smoother than in *M. opaculus*, punctures very indistinct; a few small granules present laterally. Prosternal intercoxal projection almost identical in shape with that of *M. opaculus* but punctures very small, shallow and indistinct. Mesosternal intercoxal process almost as broad as that of southern *M. opaculus*, unlike the narrow process of northern populations. Anterior intercoxal process of metasternum with submarginal groove almost obsolete, metasternum and metepisternum with punctures so indistinct as to be almost indistinguishable.

Sternites of abdomen like those of *M. opaculus* except that intercoxal projection without submarginal groove in middle.

Epipleura of elytra impunctate, with very strong microsculpture (visible at 25 x magnification), without granules.

The whole undersurface bears much stronger microsculpture than in *M. opaculus* and thus appears duller to the naked eye.

Legs. As in *M. opaculus*.

Aedeagus (Fig.82). Differs from that of *M. opaculus* in lateral view in that basale relatively stouter. In dorsal view, apicale with sides barely sinuate, base relatively narrower, sides of basale relatively more strongly curved.

FEMALE

Like male but usually larger and relatively broader. The sexes are very difficult to distinguish without dissection.

DIMENSIONS

Measurement	*Mean*	*S.D.*	*C.V.*	*Range*	*Number*
Pr.L.	5.26 mm	0.19 mm	3.6	4.8- 5.6 mm	20
E1.L.	16.18 mm	0.74 mm	4.6	14.9-17.4 mm	20
Pr.L + E1.L.	—	—	—	19.6-22.8 mm	20
Pr.W.	8.54 mm	0.44 mm	5.2	7.7- 9.2 mm	20
Ap.W.	4.94 mm	0.25 mm	5.0	4.3- 5.6 mm	20
H.W.	3.98 mm	0.16 mm	4.0	3.7- 4.2 mm	20

Range. Width 9.3-11.4 mm

TYPE MATERIAL. Holotype ♀. Tawhiti Rahi, Poor Knights Islands, xi.45. coll. Auckland Museum, AMNZ. Allotype ♂. Tawhiti Rahi, under stone, ca 1.i.56. J.C. Watt, NZAC. Paratypes. Same data as holotype, (♂ ♀) NZAC; same data as

allotype (2 ♂♂ 3 ♀♀) J.C.W./AMNZ. Poor Knights, A.W.B. Powell, March 1934, (2♀♀) NZAC. Tawhiti Rahi, Poor Knights Is., 23.xii.52, J.S. Edwards, (♀) AMNZ.

TYPE LOCALITY. Tawhiti Rahi, Poor Knights Is (*ca.* 50 km N.E. of Whangarei).

Material Examined. Holotype ♂, allotype ♀, 17 paratypes; 5 other specimens. Tawhiti Rahi, under stone *ca.* 1 Jan. 1956, J.C. Watt, (2) J.C.W./AMNZ (damaged specimens). Tawhiti Rahi, 21 Jan. 1943, Majors Buddle and Wilson, (1) NZAC. (damaged). Aorangi I., Poor Knights, 24 Apr. 1961, F.J. Newhook, (♂ ♀) NZAC.

Distribution. Apparently confined to the Poor Knights Islands. It is frequent under stones and in soil on Tawhiti Rahi, the largest island of the group. (Note. "Tawhiti rahi" (Maori) probably means "the great snare".)

Mimopeus parvus sp.n. (Figs. 40,49)

Most closely related to *M.vallis*, resembling also *M. thoracicus*, *M. humeralis* and *M. elongatus* in some respects. Readily distinguished from *M. humeralis* and *M. thoracicus* by the stouter aedeagus, rounded elytral shoulders, narrower and less distinct elytral submarginal channels and smoother, non-granulate elytral interstices. The aedeagus is rather like that of *M. elongatus* (Cook St populations), but the apicale is more elongate and the basale is not as stout. Differs from all populations of *M. elongatus* also in the humeral angles, which are more prominent, the basal carinae of the elytra which are sharp, although not at all raised, the absence of elytral granules and the smoother elytral interstices. Dorsal punctation rather like that of *M. impressifrons*, but there are many important differences between the two species, and the few resemblances may be attributed to convergence. Compared with *M. vallis* below.

MALE

Convex, elongate oval, rather parallel-sided. Dorsal surface black, moderately shining, ventral surface shining black, legs and antennae dark reddish-black.

Dorsal surface. Anterior of labrum very light in colour, emarginate. Antennae as in *M. vallis*. Head broad, microsculpture weaker than in *M. vallis*, barely visible at 25 x magnification. Pronotum more convex and sides more strongly curved than in *M. vallis*, submarginal channels obsolete; punctures small, shallow and relatively sparse, all separated by more than twice their own diameter on disc, few micropunctures visible at 25 x magnification; microsculpture weak, barely visible at 25 x magnification; interstices flat, granules absent. Scutellum bearing a few scattered, relatively large, punctures. Elytra convex, sides almost parallel. Shoulder narrowly rounded but not prominent, submarginal channels narrow, inner angle more distinct than in *M. vallis*. Carina at base of elytra sharp, but not at all raised. Punctures shallower, smaller and less distinct than in *M. vallis*; microsculpture much weaker, barely visible at 25 x magnification, granules absent.

Ventral surface. Granules present on prosternum, proepisternum and epipleura, absent from postgenae, mesosternum, metasternum and metepisternum, very weak on lateral parts of visible abdominal sternites 1 and 2. Postgenal emargination at base of cardo slightly raised laterally, but not dentate. Punctures of prosternum larger and deeper than in *M. vallis*, but punctures of other ventral sclerites smaller and shallower. Posterior part of prosternal intercoxal process more prominent than in *M. vallis*, other intercoxal processes approximately as in *M. vallis*.

Legs. As in *M. vallis* except punctures of femora, which are smaller and shallower.

Aedeagus (Fig.40). In dorsal view apicale less elongate, sides more strongly sinuate and base broader than in *M. vallis*, more strongly curved downwards in lateral view. Basale slightly more slender in lateral view.

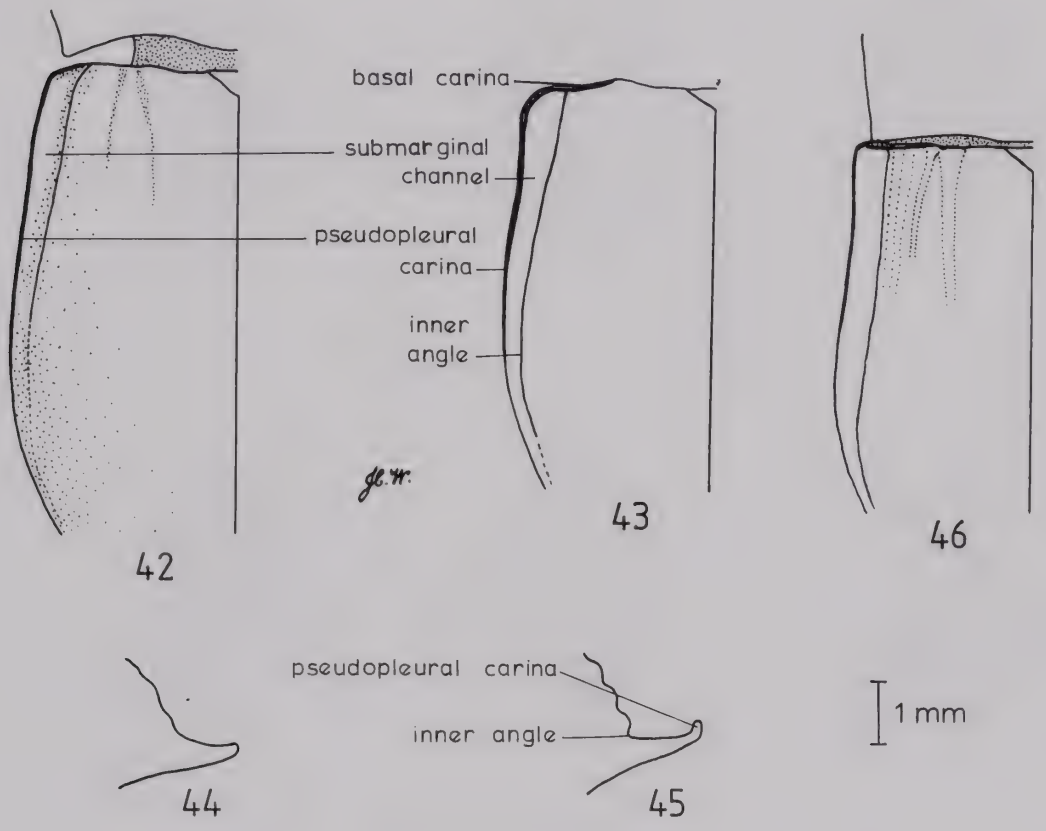
FEMALE

Legs slightly shorter than in male, otherwise difficult to distinguish.

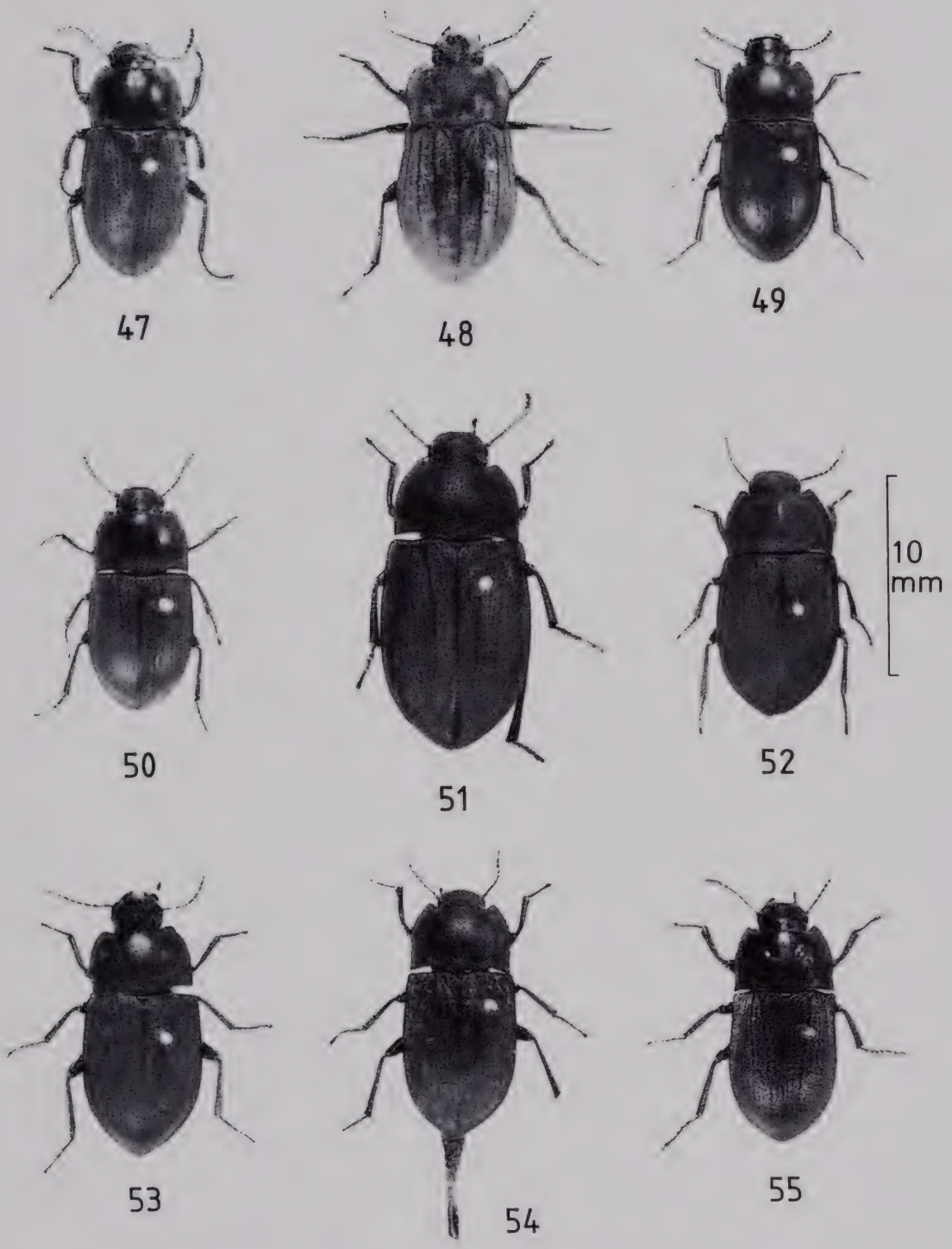
DIMENSIONS

	Holotype ♂	*Allotype* ♀
Length	9.8 mm	9.6 mm
Width	4.9 mm	4.9 mm

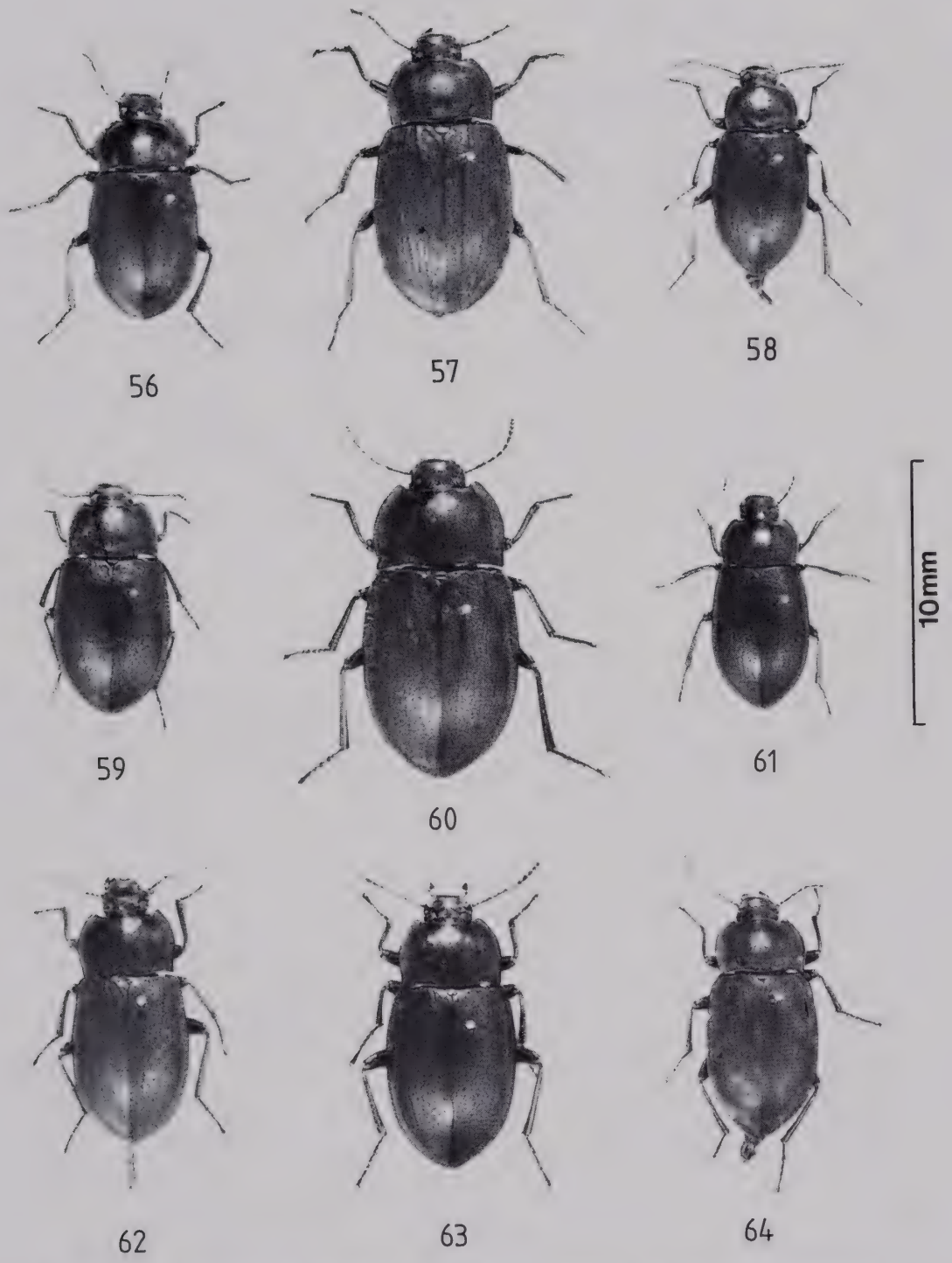
Range (entire species). Length 8.2-12.6 mm, width 4.2-5.7 mm.



Figs. 42-46. *Mimopeus* spp. Details of elytron. 42. *M. pascoei*, Glory Bay, Pitt I, Chathams. Left elytron. 43. *M. subcostatus*, Chatham Is. Left elytron. 44. *M. pascoei*. Diagrammatic section of lateral margin of elytron. 45. *M. subcostatus*. Diagrammatic section of lateral margin of elytron. 46. *M. parallelus*, Glen Alton, Clarence Valley. Left elytron.



Figs.47-55. *Mimopeus* spp. 47. *M. humeralis,* Wellington. 48. *M. rugosus.* Wedderburn. 49. *M. parvus,* Molesworth, Awatere Valley. 50. *M. thoracicus,* Lyttleton. 51. *M. costellus,* Loburn, Canterbury. 52. *M. lateralis,* Hanmer. 53. *M. clarkei,* Molesworth. 54. *M. granulosus,* Dyers Pass, Christchurch. 55. *M. parallelus,* Glen Alton, Lower Clarence Valley.



Figs. 56-64. *Mimopeus* spp. 56. *M. opaculus*, Stewart I form. 57. *M. insularis*, Tawhiti Rahi, Poor Knights Is. 58. *M. opaculus*, Central North I form, Gisborne. 59. *M. opaculus*, Mid-Canterbury form, Broken River, Canterbury. 60. *M. opaculus*, Cook Strait form, Stephens I. 61. *M. opaculus*, specimen labelled Waiheke I. 62. *M. opaculus*, Banks Pen. form, Akaroa. 63. *M. opaculus*, Central North I form, Silverstream. 64. *M. opaculus*, Cuvier I form.

GEOGRAPHICAL VARIATION

Specimens from Mt. Percival, near Hanmer differ very little from the Molesworth individuals. The postgenae have more uneven, almost granulate, interstices; the form is slightly less convex and more broadly oval; and the average size slightly larger.

TYPE MATERIAL. Holotype ♂. Molesworth, Awatere River, under stone, 25 Dec. 1943, C.E. Clarke, AMNZ. Allotype ♀ with same data as holotype, BMNH. Paratypes with same data as holotype; (2♂♂ 2 ♀♀) BMNH; (♂ ♀) AMNZ; (♂) NZAC.

TYPE LOCALITY. Molesworth, Awatere River, Marlborough. Presumably the types were collected fairly near the Molesworth Station homestead.

Material examined. Holotype ♂, allotype ♀, 9 paratypes, 9 other specimens: Mt Percival, 3000-4000ft. [*ca.* 915-1220 m], near Hanmer, 30 October 1962, P.M. Johns, (5) NZAC; (4) Johns.

Distribution. Known only from Molesworth, Marlborough, and Mt Percival, North Canterbury.

Mimopeus vallis sp.n. (Fig.41)

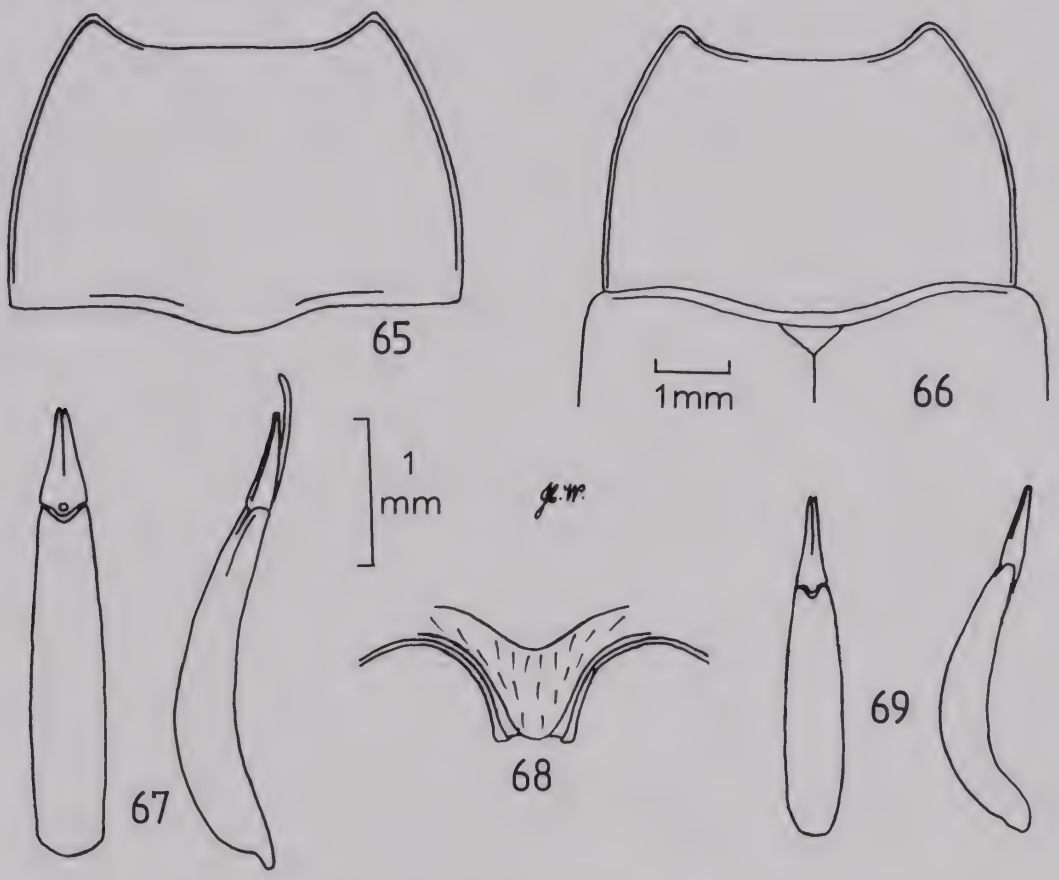
Related to *M. parvus* in many aspects, similar to *M. thoracicus* in others, and also showing certain resemblances to *M.elongatus*. Readily distinguished from *M. parvus* by its much stronger dorsal microsculpture, granulate elytra, and the structure of its aedeagus. Compared with *M. thoracicus* and *M. elongatus* below.

MALE

Oblong oval, convex, sides relatively parallel. Dorsal surface dull black, ventral surface shining black, legs dark reddish-black, antennae reddish.

Dorsal surface. Labrum and head relatively broader than in *M. thoracicus*, labrum more strongly emarginate. Dorsal surface of head closely, rather finely, and not deeply punctured, microsculpture just visible at 25 x magnification. Pronotum variable in shape, convex, submarginal channels obsolete; macropunctures small and shallow, separated mostly by more than twice their own diameter on disc, micropunctures just visible at 25 x magnification; microsculpture strong, clearly visible at 25 x magnification; granules absent, but small, smooth, shining areas which lack microsculpture are visible at 25 x magnification. Scutellum shining, macropunctures larger and deeper than in *M. thoracicus*. Elytra convex, form very similar to that of *M. elongatus* from the Cook Straight Islands, but shoulder more prominent, although not as prominent as in *M. thoracicus*, and base of elytra represented by distinct angular carinae, which are, however, not raised as they are in *M. thoracicus*. Submarginal channels narrow, approximately as in *M. elongatus* (Cook St populations), narrower than in *M. thoracicus*, inner angle obsolete as in *M. elongatus*. Punctation like that of *M. elongatus*, punctures relatively small; microsculpture strong, clearly visible at 25 x magnification; interstices of entire surface bearing granules visible at 25 x magnification.

Ventral surface. Postgenae, prosternum, proepisternum, depressed part of mesosternum, lateral parts of metasternum, metepisternum, lateral parts of first three abdominal sternites



Figs. 65-69. *Mimopeus* spp. Thorax and aedeagus. 65. *M. buchanani*, Pukerua Bay. Pronotum, male. 66. *M. lateralis*, Hanmer. Pronotum, male. 67. *M. buchanani*, Pukerua Bay. Aedeagus. 68. *M. buchanani*, Pukerua Bay. Mesosternal intercoxal process, male. 69. *M. lateralis*, Hanmer. Aedeagus.

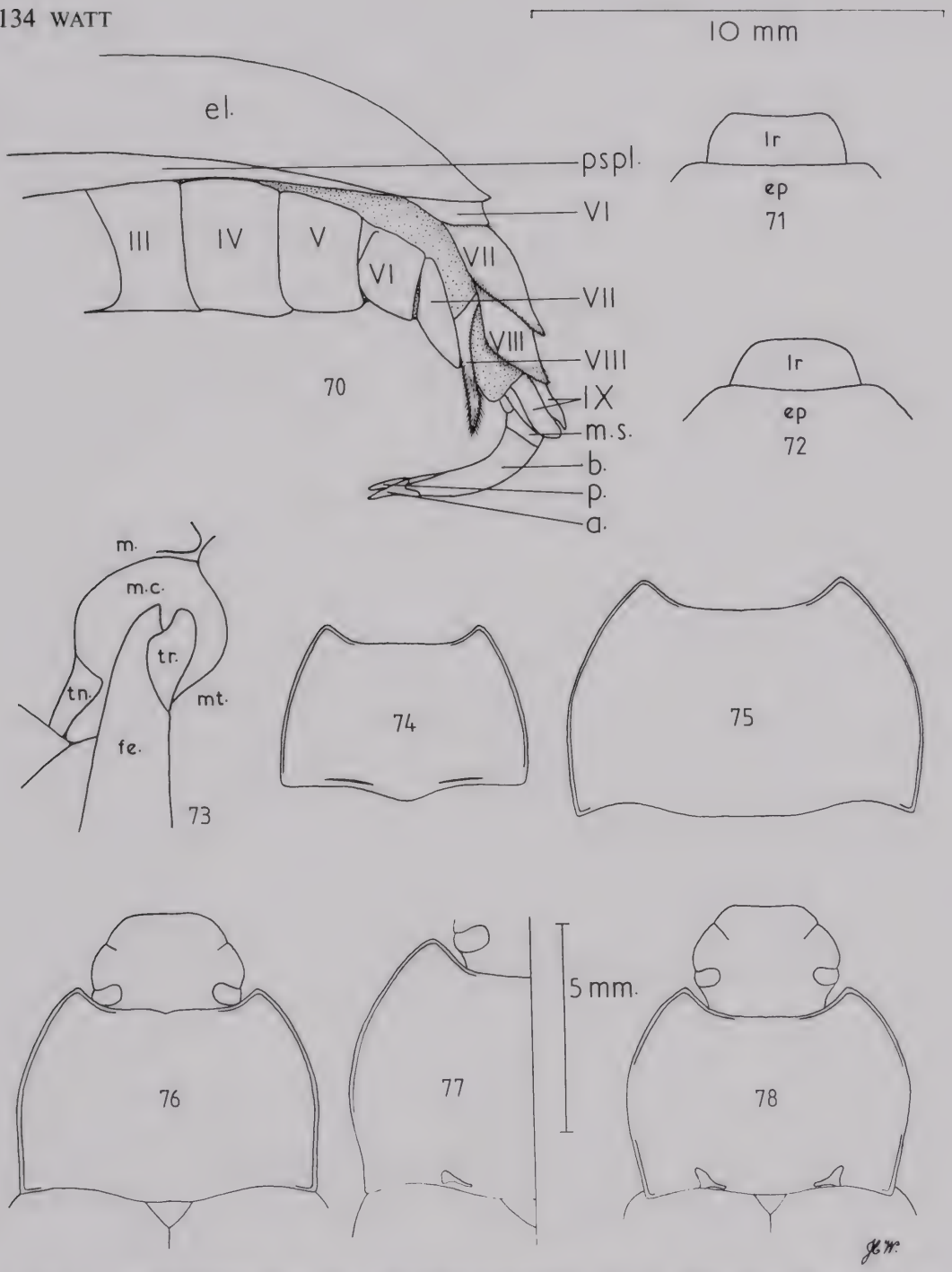
and epipleura all bearing granules clearly visible at 25 x magnification, particularly large on prosternum, mesosternum and postgenae. Posterior part of prosternal intercoxal process less prominent than in *M. thoracicus* or *M. elongatus*, other intercoxal processes approximately as in *M. thoracicus*. Punctation like that of *M. thoracicus*.

Legs. Approximately as in *M. thoracicus*.

Aedeagus (Fig.41).Much larger than in *M. thoracicus* but of the same basic type, not showing the short or very short apicale and stout basale of *M. elongatus*. In dorsal view apicale relatively stouter and basale relatively more slender than in *M. thoracicus*. In lateral view all parts relatively stouter than in M. thoracicus.

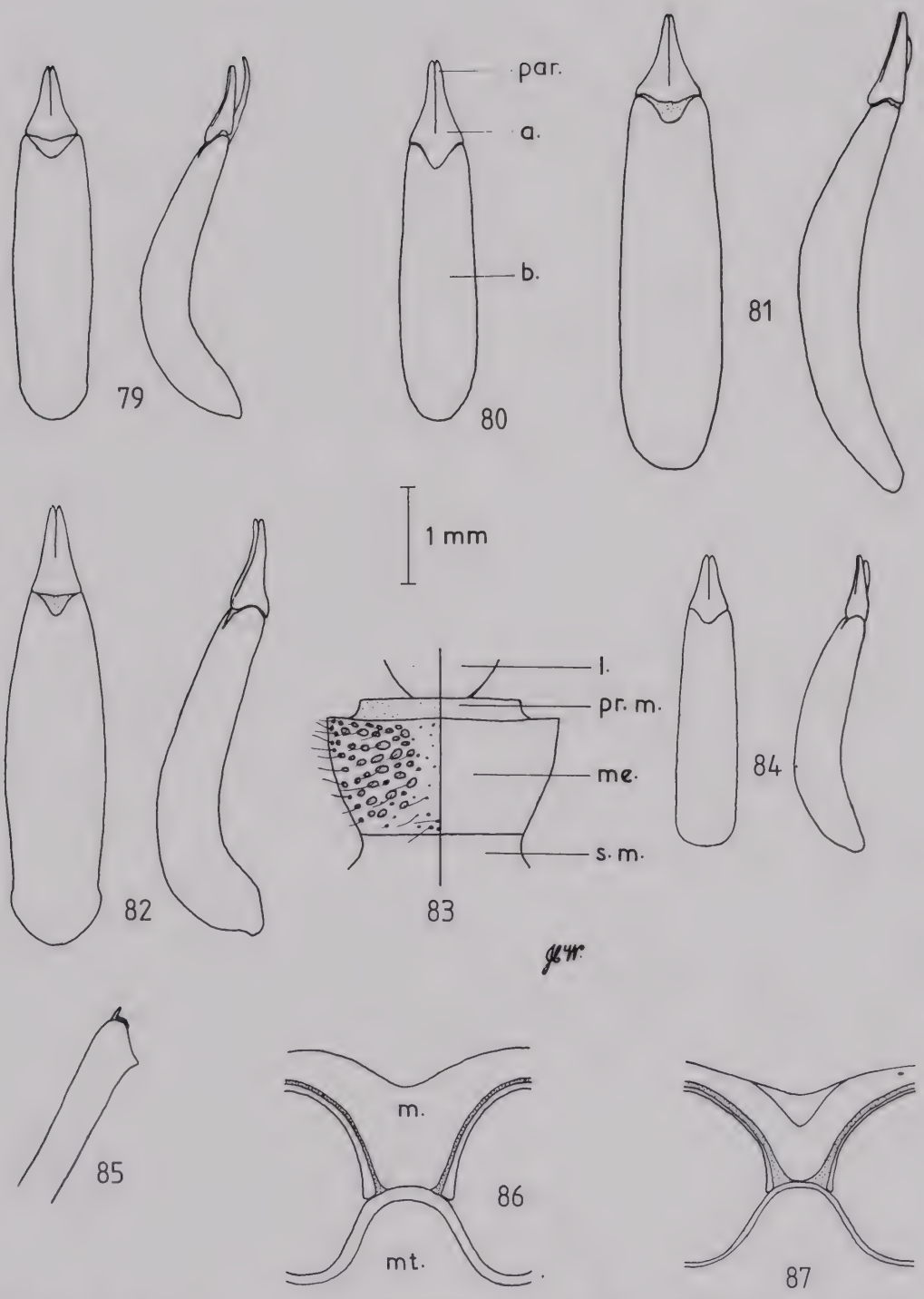
FEMALE

Like male, but slightly broader and more convex, legs relatively shorter, average size larger.



Figs. 70-78. *Mimopeus* spp. Head, thorax and abdomen. 70. *M. opaculus*, Cook Strait form, Stephens I. Lateral view of abdomen of male with aedeagus everted as in copulation. Roman numerals indicate segments of abdomen to which sclerites belong. 71. *M. opaculus*. Anterior view of labrum and front margin of clypeus. 72. *M. insularis*. Anterior view of labrum and front margin of clypeus. 73. *M. opaculus*. Ventro-lateral view of mesocoxa and associated structures. 74. *M. buchanani*, Pukerua Bay. Pronotum, male. 75. *M. opaculus*, Broken River. Pronotum, male. 76. *M. opaculus*, Albury. Head and pronotum, male. 77. *M. opaculus*, Mt Maungatua. Head and pronotum left side only. 78. *M. opaculus*, Owen I, S.E. Stewart Is. Head and pronotum, male.

a. apicale of tegmen, b. basale of tegmen, m.s. membranous sheath of aedeagus, el. elytron, p. penis (median lobe), p.s.p.l. epipleuron of elytron. e.p. front margin of clypeus, lr. labrum. fe. femur, m. mesosternum, m.c. mesocoxa, mt. metasternum, tn. trochantin, tr. trochanter.



Figs. 79-87. *Mimopeus* spp. Head, thorax and aedeagus. 79. *M. opaculus*, Canterbury form, Albury. Aedeagus, male. 80. *M. opaculus,* Owen I, S.E. Stewart Is. Aedeagus. 81. *M. opaculus,* Cook Str., Stephens I. Aedeagus. 82. *M. insularis,* Poor Knights. Aedeagus of holotype. 83. *M. opaculus,* Central North I, Gisborne. Mentum. 84. *M. impressifrons.* Aedeagus of lectotype. 85. *M. impressifrons,* Cromwell. Dorsal view of right front tibia, lectotype male. 86. *M. opaculus,* North I. 87. *M. opaculus,* South I. Mesosternal intercoxal process and anterior metasternal intercoxal process.

l.ligula, pr.m. premental membrane, me. mentum, s.m. submentum. m. mesosternal intercoxal process, mt. anterior metasternal intercoxal process.

DIMENSIONS

	Holotype ♂	*Allotype* ♀
Length	9.4 mm	10.0 mm
Width	4.8 mm	5.4 mm

Range (entire species). Length 8.7-13.0 mm, width 4.3-6.1 mm.

GEOGRAPHICAL VARIATION

The description is based on the long type series from Jordan, Awatere Valley. There is slight geographical variation in development of dorsal and ventral granules, which are rather smaller in specimens from Seddon to the north, and rather larger (ventrally only) in specimens from Upcot to the south. The apicale of Upcot individuals is more elongate.

TYPE MATERIAL. Holotype ♂. Jordan, Awatere Valley, under stone in river bank, 8 March 1961, J.C. Watt, NZAC. Allotype ♂ with same data as holotype, NZAC. Paratypes with same data as holotype, (4♂♂ 4♀♀) NZAC; (5♂♂ 5♀♀) NZAC; (♂ ♀) AMNZ (♂ ♀) BMNH; (♂ ♀) CMNZ (♂ ♀) NMNZ; (8 in alcohol) NZAC.

TYPE LOCALITY. Jordan, Awatere Valley, Marlborough.

Material examined. Holotype ♂, allotype ♀, 34 paratypes, 26 other specimens. Seddon, 26 Feb. 1916, H.H., (2) NMNZ. Durngree, under stones etc. 17 Nov. 1942, D. Spiller, (2) NMNZ. Camden, Awatere Valley, under stones, 9 March 1961, J.C.W., (10) NZAC. Limestone Creek (near Upcot), Awatere Valley, 20 February 1916, H.H., (2) NMNZ. Upcot, Awatere Valley, ca. 2,500 ft. [*ca* 762 m], under stones, 9 March 1961, J.C.W., (10) NZAC.

Distribution and ecology. Apparently confined to the lower and middle Awatere Valley, a dry valley just west of the inland Kaikoura Range, Marlborough. The types were collected under stones amongst sclerophyll scrub (*Discaria* etc.) on the banks of a small river near the old Jordan homestead. The remaining material collected by me was found under stones in little modified tussock grassland and sclerophyll scrub. None was found in sown pasture land.

Mimopeus clarkei sp.n. (Fig.53)

MALE

Smaller than typical *M. costellus*. Elytral costae less distinct. Sides of pronotum more strongly curved, pronotum more convex, punctures smaller, microsculpture of interstices weak, surface moderately shining. Elytral granules smaller, confined to lateral and hind slopes, costae only slightly raised. Shoulder less prominent, but narrowly rounded.

Mesosternal intercoxal process relatively broader, median part less convex. Punctation of prosternal intercoxal process less dense. Granules of epipleura of elytra small, barely visible at 25 x magnification.

Aedeagus smaller, base of basale more strongly curved downwards; otherwise identical with that of *M. costellus*.

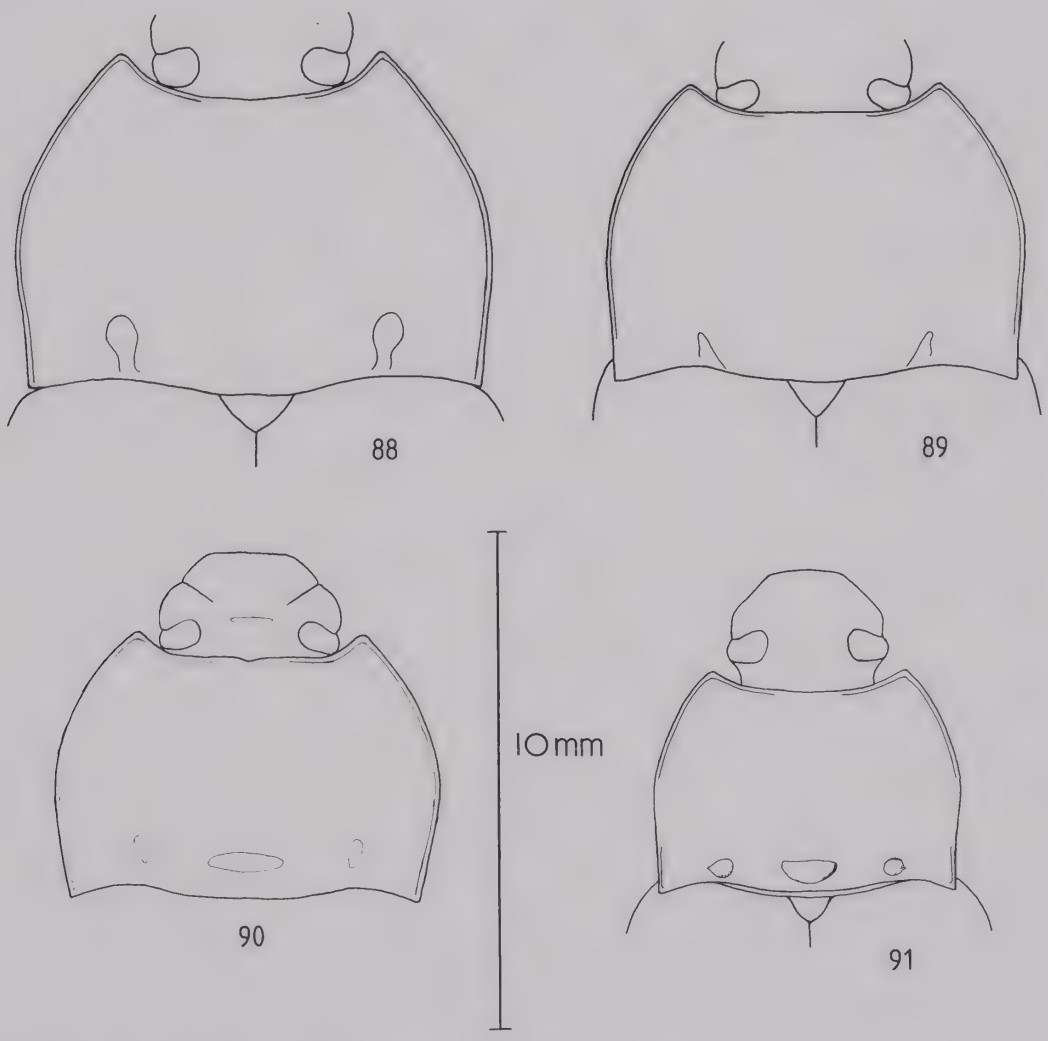
FEMALE

Like male, but legs relatively shorter and more slender.

DIMENSIONS

	Holotype ♂	*Allotype* ♀
Length	12.1 mm	12.2 mm
Width	6.3 mm	6.5 mm

Range. Length 10.6-16.8 mm, width 5.7-7.3 mm.



Figs. 88-91. *Mimopeus opaculus*. Head and pronotum. 88. *M. opaculus*, Cook Strait form, Stephens I. Male. 89. *M. opaculus*, Central North I form, Manawatu Gorge (lectotype of *M. smithianus*). 90. *M. opaculus*, Central North I form, Red Rocks, Wellington. Male. 91. *M. opaculus*, Central North I form, Waihirere near Gisborne. Male.

GEOGRAPHICAL VARIATION

The types were collected at Molesworth in the upper Awatere Valley. Four males from near Avondale in the Avon Valley, the next main valley to the west, are more convex than the Molesworth specimens, the pronotal sides are more strongly curved, the elytral granules are larger, and the aedeagus is slightly more slender, with more elongate apicale.

TYPE MATERIAL. Holotype ♂. Molesworth, Awatere Valley, 25.xii.45, C.E. Clarke, C.E.C./AMNZ. Allotype ♀ with same data as holotype, AMNZ. Paratypes, (3) AMNZ; (5) BMNH, all with same data as holotype.

TYPE LOCALITY. Molesworth, Awatere Valley, Marlborough.

Material examined. Holotype, allotype and 8 paratypes; 6 other specimens. Awatere Valley, October; Avon Valley near Avondale, August.

Distribution. Upper Awatere Valley and Avon Valley, Marlborough. Found under stones amongst dry scrub (*Discaria* etc.) and bracken (*Pteridium esculentum*) in the latter locality.

This species is named in honour of the late Mr C.E. Clarke, of Auckland, who collected most of the Coleoptera and Lepidoptera in the Auckland Museum. He spared no effort to collect in remote and inaccessible localities, and many interesting novelties, mainly undescribed, are to be found amongst his material.

Mimopeus parallelus sp.n. (Figs.39,46,55)

This species possesses some morphological features in common with *M. thoracicus*, rather fewer with *M. humeralis*, and a number quite peculiar to itself. It is readily distinguished from all other species of *Mimopeus* by the macrosculpture and highly polished interstices of the elytra and its more obviously parallel-sided form. Apart from the relationship to *M. thoracicus* and *M. humeralis*, it resembles *M. granulosus* in a number of respects, but is readily distinguished by its much smaller punctures, shining, non-granulate elytral interstices, curved apicale, less elongate basale and other characters.

MALE

Dark reddish brown to reddish black. Form oblong-oval, broad, convex, parallel-sided, less elongate than *M. humeralis*, sides straighter than in *M. thoracicus*.

Dorsal surface. Antennae as in *M. thoracicus*. Head similar to that of *M. thoracicus*, but labrum more strongly emarginate anteriorly; head broader and macropunctures larger and deeper than in *M. humeralis*. Pronotum convex, shape approximately as in *M. humeralis*, punctures rather larger and deeper than in *M. thoracicus* or *M. humeralis*; microsculpture strong, clearly visible at 25 x magnification. Scutellum shining, bearing scattered small, deep punctures. Elytra (Figs. 46,55) very convex, short, sides almost parallel, widest at about two thirds distance from base. Shoulder prominent, right-angled, narrowly rounded. Epipleural carinae run back from shoulder almost straight for about half the distance to apex, and then converge in a broad curve to apex. Submarginal channel broad and deeply defined from shoulder to beyond mid-length with epipleural carina reflexed vertically outside it for the same distance. Basal carina distinct, raised, extending from shoulder to base of first primary costa. Elytral punctures much larger and deeper than in *M. thoracicus* or *M. humeralis*,

running together to form irregular foveae between the costae, which are clearly visible, but rather rounded and irregular. Interstices between foveae (including costae) highly polished and lacking granules, although a few small granules are present in the heavily microsculptured submarginal channels.

Ventral surface. Head like that of *M. thoracicus*. Prosternum bearing laterally granules which are much larger than those of *M. thoracicus* or of *M. humeralis*. Proepisternum highly polished, bearing small granules. Median part of prosternal intercoxal process less prominent than in *M. humeralis*, similar to that of *M. thoracicus*. Mesosternal intercoxal process narrow, granules of depressed part of mesosternum larger than in *M. thoracicus* or *M. humeralis*. Metasternum and abdominal sternites approximately as in *M. humeralis*, but granules larger. Epipleura shining, bearing distinct granules.

Legs. Approximately as in *M. thoracicus*, punctures of front tibiae are larger and deeper than in *M. humeralis*.

Aedeagus (Fig.53). Rather similar to that of Kaikoura specimens of *M. thoracicus*, but in dorsal view tips of parameres diverging, sides of apicale noticeably sinuate, basale more slender; and in lateral view apicale curved distinctly downwards from base to apex. Stouter and less elongate than that of *M. humeralis*.

FEMALE

Usually slightly larger than male, legs relatively slightly shorter.

DIMENSIONS

	Holotype ♂	*Allotype* ♀
Length	10.4 mm	11.4 mm
Width	5.6 mm	5.8 mm

Range. Length 8.8-13.9 mm, width 4.8-6.2 mm.

TYPE MATERIAL. Holotype ♂. Glen Alton, Clarence Valley, under stone (on river bank), 10.iii.61, J.C. Watt, NZAC. Allotype ♀ with same data as holotype, NZAC. Paratypes with same data as holotype or collected on 21.viii.1962, (5♂ ♂ 5♀ ♀) NZAC; (2♂ ♂ 2♀ ♀) AMNZ; (2♂ ♂ 2♀ ♀) NMNZ; (2♂ ♂ 2♀ ♀) CMNZ; (2♂ ♂ 2♀ ♀) BMNH; (56) J.C.W. (chiefly in alcohol). Paratypes, Clarence River, 1.ii.1922, G Archey, (2♂ ♂ ♀) CMNZ; Clarence River, 21.i.30, under log, G.V. Hudson, (2♀ ♀) BMNH.

TYPE LOCALITY. Banks of George Creek, Lower Clarence Valley (near Clarence Bridge), Marlborough.

Material examined. Holotype ♂, allotype ♀, 87 paratypes, 7 other specimens. Clarence Bridge, 24.i.30, G.V. Hudson, (2) BMNH; (5) NMNZ.

Distribution and ecology. Known only from the lower Clarence Valley, where it occurs frequently, sometimes abundantly, under stones on river flats, usually around the bases of shrubs such as *Discaria* and a small-leaved *Coriaria*. The larvae are found under the same stones, but in the stony soil beneath, rather than directly beneath the stones.

Mimopeus johnsi sp.n. (Fig.95)

A distinctive species, most closely related to *M. costellus*. In some respects it resembles *M. tibialis*, but may be distinguished readily by the outer apical angle of the anterior tibia and the outer angle of the postgenal emargination, neither of which are dentate; by the broader and more clearly defined pronotal and elytral submarginal channels; and by other less obvious features.

MALE

Elongate oval, convex, black.

Dorsal surface. Dorsal punctures smaller than in *M. costellus*. Pronotum more convex, and sides more strongly curved than in *M. costellus;* submarginal channels present. Punctures of disc separated mostly by about 2 x their own diameter, interstices flat, microsculpture strong, clearly visible at 25 x magnification. Micropunctures distinct, deep to shallow, clearly visible at 25 x magnification. Elytra convex, elongate, sides subparallel basally. Flat submarginal channels extending from shoulder two thirds distance to apex, inner angle distinct; epipleural carina slightly reflexed. Shoulder narrowly rounded, but not prominent. Basal carina sharp, distinct, but barely or not raised. Elytral costae indistinct; granules absent except for a few small ones, which are scarcely visible at 25 x magnification, on submarginal channels. Punctation and microsculpture similar to that of pronotum. Setae of macropunctures clearly visible at 25 x magnification, especially on lateral slopes.

Ventral surface. Outer angle of maxillary emargination of postgenae slightly elevated, but bluntly rounded, not at all dentate. Granules of sterna and epipleura smaller than those of *M. costellus*, but granules of postgenae and proepisternaum larger. Intercoxal processes broader than in *M. costellus.* Punctures of ventral surface small to minute.

Legs. Femora finely punctured, smooth. Front tibiae very uneven below, and bearing small stout bristles. Middle and hind tibiae uneven and bearing similar bristles on lateral and ventral surfaces; other surfaces bearing finer and longer setae and less uneven, but deeply punctate.

Aedeagus (Fig.95). Rather similar to that of *M. costellus*, but apicale more elongate. Dorso-lateral surface of apicale forming a distinct longitudinal carina, below which is a longitudinal lateral groove extending from base towards apex, distinctly impressed for the first one third of the distance. Ventro-lateral angle distinctly carinate from base one quarter of distance to apex. These characters of the aedeagus appear to be unique in the genus.

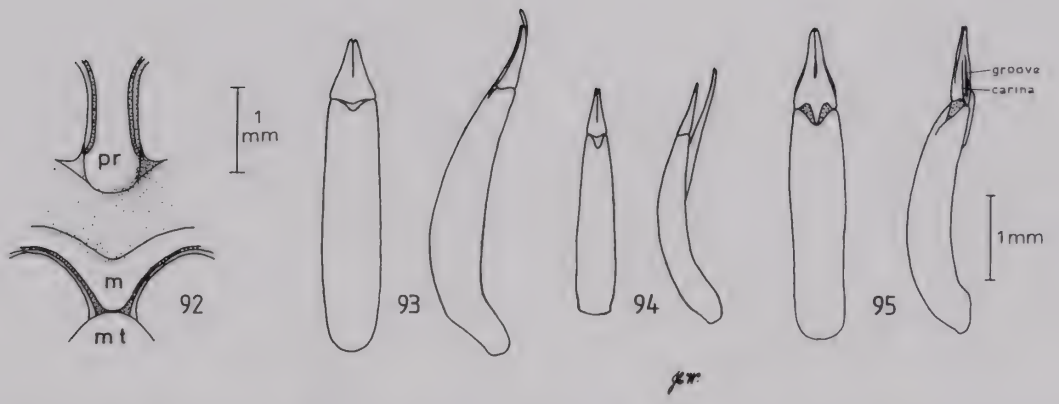
FEMALE

Not evidently distinguishable from male except by genitalia and terminal abdominal sclerites.

DIMENSIONS

	Holotype ♂	*Allotype* ♀	*Paratype* ♀
Length	13.8 mm	15.1 mm	14.1 mm
Width	6.9 mm	7.8 mm	7.2 mm

TYPE MATERIAL. Holotype ♂. Mt Percival, 3500-5200 ft.[*ca.*1067-1586m], near Hanmer, 30.x.62, P.M. Johns, CMNZ. Allotype ♀ with same data as holotype, CMNZ. Paratype ♀ with same data as holotype, NZAC.



Figs. 92-95. *Mimopeus* spp. Thorax and aedeagus. 92. *M. costellus*, typical form Loburn. Ventral view of part of thorax, male. 93. *M. costellus*, Loburn. Aedeagus. 94. *M. granulosus*, Dyers Pass. Aedeagus. 95. *M. johnsi*. Aedeagus of holotype.

TYPE LOCALITY. Mt Percival, near Hanmer, northern Canterbury.

Material examined. Holotype ♂, allotype ♀, paratype ♀.

Distribution. Known only from the type locality.

The species is named in honour of Mr P.M. Johns, who has greatly increased our knowledge of the Canterbury species of *Mimopeus* by his assiduous collecting.

Mimopeus convexus sp.n. (Figs.96,103)

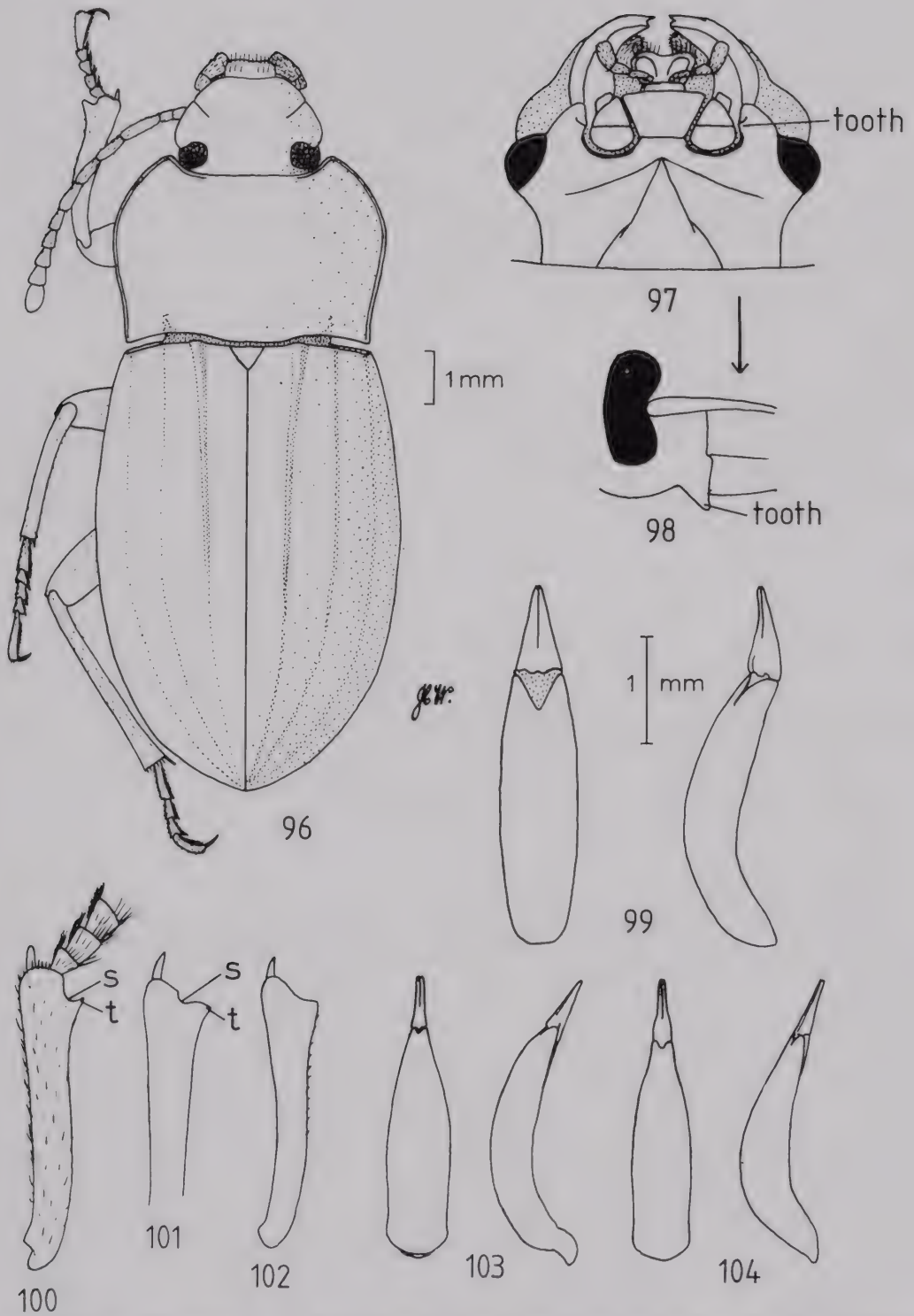
Most closely related to *M. rugosus*. Superficially similar to *M. tibialis*, but readily distinguished by the structure of the aedeagus; and the rounded, non-dentate lateral projection of the emargination of postgenae at base of cardo.

MALE

Elongate oval, convex (Fig.96). Dorsal surface and legs reddish black, slightly shining, antennae reddish, ventral surface shining black.

Dorsal surface. Labrum barely emarginate anteriorly, finely punctate, bearing numerous fairly stout setae. Punctures of dorsal surface of head smaller and shallower than in *M. rugosus* interstices flat, surface shining, microsculpture weak; micropunctures small and shallow, just visible at 25 x magnification. Pronotum more convex and more transverse than in *M. rugosus*, sides more strongly curved. Punctures smaller and shallower than in *M. rugosus*, macropunctures of disc separated mostly by more than their own diameter; micropunctures small and shallow, interstices flat. Surface shining, microsculpture not visible at 25 x magnification. Scutellum bearing small, deep punctures.

Elytra convex, more elongate than in *M. rugosus*. Costae obsolete, indicated only by slight elevations. Basal elytral carina distinct, but only slightly raised shoulder narrowly rounded; submarginal channel obsolete. Punctures much smaller and shallower than those of *M. rugosus* interstices only slightly uneven, microsculpture not strong, scarcely visible at 25 x magnification.



Figs. 96-104. *Mimopeus* spp. Whole insect, head, legs and aedeagus. 96. *M. convexus*. Holotype male. 97. *M. tibialis*. Ventral surface of head showing tooth (t) at outer angle of maxillary emargination. 98. *M. tibialis*. Lateral view of head showing tooth (t) etc. 99. *M. tibialis*, Christchurch. Aedeagus of lectotype. 100. *M. tibialis*. Dorsal view of anterior right tibia of lectotype. 101. *M. rugosus*, Upper Wedderburn. Dorsal view of anterior right tibia, male. 102. *M. granulosus*, Dyers Pass, Christchurch. Dorsal view of anterior right tibia, male. 103. *M. convexus*, Mt Hay, Tekapo. Aedeagus of holotype. 104. *M. rugosus*, Hyde. Aedeagus. s, sinus, t, tooth.

Ventral surface. Punctures of ventral sclerites much smaller and shallower than those of *M. rugosus*, setae much finer. Intercoxal processes as in *M. rugosus* except prosternal, which is less prominent posteriorly. Granules absent except on epipleura.

Legs. Punctures of legs smaller and shallower and hairs finer than in *M. rugosus*. Outer angle of anterior tibia as in *M. rugosus*, but "sinus" beside it deeper.

Aedeagus (Fig.103). Like that of *M. rugosus* except that apicale and apex of basale are even more slender in dorsal view.

FEMALE

Distinctly broader and more convex than male, legs shorter and more slender.

DIMENSIONS

	Holotype ♂	*Paratypes* ♂, L. Tekapo					Black Forest	
Length	11.9mm	11.0mm	11.7mm	11.5mm	11.2mm	11.7mm	12.2mm	11.8mm	11.8mm
Width	5.8mm	5.5mm	5.8mm	5.6mm	5.6mm	5.8mm	5.9mm	5.7mm	5.7mm

	Allotype ♀	*Paratypes* ♀, L. Tekapo				Pukaki	Black Forest	
Length	12.0mm	12.2mm	12.4mm	12.7mm	12.1mm	14.4mm	12.4mm	12.8mm	13.1mm
Width	6.0mm	6.2mm	6.4mm	6.6mm	6.5mm	7.6mm	6.2mm	6.4mm	6.6mm

Range.	Length	♂ 11.0-12.2mm	♀ 12.0-14.4mm
	Width	♂ 5.5- 5.9mm	♀ 6.0- 7.6mm

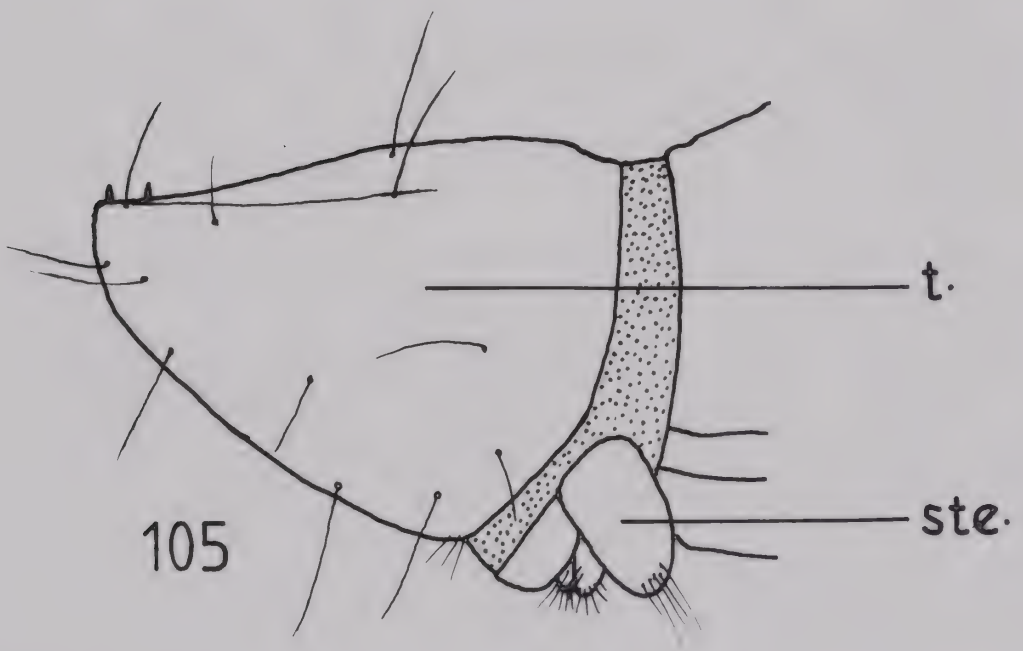


Fig. 105. *Mimopeus elongatus.* Final instar larva. Lateral view of terminal abdominal segment, anterior on right.
t. tergite, ste. sternite.

TYPE MATERIAL. Holotype ♂. Mt Hay, Tekapo, 2600 ft.[*ca.* 7930m], scree, 7.xii.62, P.M. Johns, CMNZ. Allotype ♀. Lake Tekapo, army camp area, xi.1957, P.S. Evans, CMNZ. Paratypes with same data as allotype, (♂ ♀) CMNZ. Mt John, S.W.L. Tekapo, rocky outcrop near trig, 24.ix.60, M. Williams, (♂) NZAC; (♂) BMNH; (♂) J.C.W. Mt Hay Station, E. Shore L. Tekapo, under stones, 24.xi.60, M. Williams, (♀) BMNH; (♀) J.C.W. Mt John, Tekapo, 3-3500 ft.[*ca.* 915-1067m], scree, 7.xii.62, P.M. Johns, (♂) NZAC. Lake Tekapo, under rocks, army camp, 25.xi.56, P.M. Johns, (♀) NMNZ. Lake Pukaki, 15.xi.55, B.B. Given (♀) NZAC. Black Forest Creek near Benmore Pass, scree, 1900 ft.[*ca.* 579m], 6.xii.62, P.M. Johns, (♂ ♀) CMNZ; (♂) NMNZ; (♂ ♀) AMNZ. Black Forest, Benmore Pass scree, 2,800 ft.[*ca.* 854m], P.M. Johns, (♀) NZAC.

TYPE LOCALITY. Vicinity of Lake Tekapo, southwest Canterbury.

Material examined. Holotype, allotype and 16 paratypes.

Distribution. Apparently confined to the MacKenzie Basin, Canterbury, where they are found under stones.

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